The Advantage®, E9000® and PowerPro®
Systems Instruction Manual

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Record the Model and Serial Numbers of the controller(s) and handpiece(s), and date received. Retain for future reference.

Controller Model No.	_____	**Serial No**	_____	**Date**	_____
Controller Model No.	_____	**Serial No**	_____	**Date**	_____
Handpiece Model No.	_____	**Serial No**	_____	**Date**	_____
Handpiece Model No.	_____	**Serial No**	_____	**Date**	_____
Handpiece Model No.	_____	**Serial No**	_____	**Date**	_____
Handpiece Model No.	_____	**Serial No**	_____	**Date**	_____
Handpiece Model No.	_____	**Serial No**	_____	**Date**	_____
Handpiece Model No.	_____	**Serial No**	_____	**Date**	_____
Handpiece Model No.	_____	**Serial No**	_____	**Date**	_____
Handpiece Model No.	_____	**Serial No**	_____	**Date**	_____

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1.0 INTRODUCTION

It is recommended that personnel study this manual before attempting to operate, clean or sterilize the Advantage®, E9000® or *PowerPro*® System. The safe and effective use of this equipment requires the understanding of and compliance with all warnings, cautionary notices, and instructions marked on the product, and included in this manual.

1.1 Intended Use

The E9000 System is a combination handpiece-drive and low-flow irrigation pump. The controller operates a variety of handpieces consisting of drills, shavers, and saws, in conjunction with assorted attachments to perform bone cutting, reaming and drilling, and soft tissue resection.

The irrigation pump and tubing sets provide a sterile fluid supply to the blades, burs and drill bits, at the surgical site, to prevent clogging and for lavage and cooling.

The Advantage Drive System combines the functionality of the APEX® Drive System, the E9000 System and the PRO2000 *PowerPro* System into one unit. The top portion of the controller is a combination handpiece-drive and low-flow irrigation pump that operates a variety of handpieces consisting of drills, shavers, and saws, in conjunction with assorted attachments to perform bone cutting, reaming and drilling, and soft tissue resection.

The bottom portion of the controller functions as a universal electric power source for an instrument system consisting of drills, shavers, saws and assorted modular attachments. This portion is designed for soft tissue resection, trauma procedures, total hip/knee arthroplasty, and ACLs.

The *PowerPro* Controller functions as a universal electric power source for an instrument system consisting of drills, shavers, saws and assorted modular attachments to perform bone cutting, reaming, drilling and driving screws, as well as soft tissue resection. The System combines the existing quality and capabilities of unprecedented control and superior reliability of the *MicroChoice*® System, designed for small-bone procedures, and the power and functionality of the APEX® Shaver System, designed for soft tissue resection, with the *PowerPro* handpieces to perform trauma procedures, total hip/knee arthroplasties, and ACLs.

The fields of application for the Advantage, E9000 and *PowerPro* Systems include Arthroscopic, Foot, Hand, Medial Sternotomy, Neurosurgical, Orthopedic, Otolaryngological, Plastic/ Reconstructive and Spinal surgical procedures.

1.2 Contraindications

The Advantage and E9000 System's irrigation pump and tubing sets are contraindicated for distention.

1.3 Warnings and Precautions

DO NOT bypass this section. It contains warnings and cautions that must be thoroughly understood before operating any of the equipment. Lack of understanding or adherence to these warnings and precautions may result in injury or even death to the patient.

Warning - A warning contains critical information regarding serious adverse reactions and potential safety hazards that can occur in proper use or misuse of the equipment. Failure to observe the information or procedures presented in a Warning may result in injury, death or other serious adverse reactions to the patient and/or surgical staff.

Precaution - A precaution contains instructions for any special care to be exercised by the practitioner for the safe and effective use of the equipment. Failure to observe the information or procedures presented in a Precaution may result in damage to the equipment.

Notes - Supplementary information may be given in a NOTE. This information has no critical effect on the patient or equipment.

This equipment is designed for use by medical professionals completely familiar with the required techniques and instructions for use of the equipment. **Prior to using the equipment, read and follow all warning and precautionary notices and instructions marked on the product and included in this manual**.

The service interval listed on page 115, is required to keep the equipment at its optimum operating performance.

1.3.1 Warnings

1. Do not open the controller chassis, as this may void the warranty. There are no user-serviceable parts inside. Removing the cover may introduce an electric shock hazard by exposing you to dangerously high voltages or other risks.
2. Eye protection is recommended when operating equipment. Eye injury may result.
3. It is the surgeon's responsibility to be familiar with the appropriate surgical techniques prior to use of the shaver blades and burs.
4. Do not attach, insert or remove accessories or attachments while the handpiece is operating. **Place the handpiece safety switch, if equipped with one, to the appropriate safe position, prior to installation or removal of items.**
5. Tubing sets, and E9000 Disposable Irrigation Tips are one-time use only. Do not resterilize or reuse. After use, dispose of properly.

6. The ability to effectively clean and re-sterilize this single use device has not been established and subsequent re-use may adversely affect the performance, safety and/or sterility of the device.

7. Disposable shaver blades and burs are sterile and for single-use ONLY. DO NOT resterilize or reuse. After use, dispose of properly.

8. The ability to effectively clean and re-sterilize this single use device has not been established and subsequent re-use may adversely affect the performance, safety and/or sterility of the device.

9. After use, shaver blades, burs and tubing sets may be a potential biohazard and should be handled in accordance with acceptable medical practice and applicable local and national requirements.

10. Do not use equipment if, upon receipt, package is opened, damaged, or shows any signs of tampering.

11. Do not use shaver blade or bur if they show any signs of damage.

12. When using blades and burs avoid excessive lateral force as breakage may occur.

13. Do not use sterile equipment after expiration date.

14. Continually check all handpieces and attachments for overheating. If overheating is sensed, immediately discontinue use and return equipment for service. Overheating can lead to patient injury or (burn).

15. Bur and neuro guards should be checked frequently. Overheating can occur if bur guard bearings are worn or not kept clean. Overheating can lead to patient burn injury. Bur and neuro guards are to be returned to the factory or a ConMed Linvatec authorized service facility for routine maintenance every six (6) months.

16. Perform the following steps to verify guards are in good operating condition:

    (a) Remove the guard from the handpiece and insert a bur into the nose of the guard.

    (b) While holding the bur, spin the guard. The guard should spin freely around the bur shaft without resistance.

    (c) Attach the guard and bur to the handpiece.

    (d) Operate the handpiece for approximately 30 seconds. Stop the handpiece and carefully feel the end of the guard where the guard encases the shaft of the bur for overheating. If overheating is noticed, return guard for service.

17. Do not use in the presence of flammable anesthetics, gases, disinfecting agents, cleaning solutions, or any material susceptible to ignition due to electrical sparking.

18. The service intervals, (**See "Table 1: Maintenance Schedule" on page 115**), are required to keep the handpieces at their optimum operating performance. Failure to follow the recommended PM schedule can cause devices to overheat which may lead to patient injury (burn).

19. Equipment grounding is vital to ensure safe operation. Plug the power cord into a properly earthed mains supply outlet whose voltage and frequency characteristics are compatible with those listed on the unit or in this manual. Do not use plug adapters or extension cords; such devices defeat the safety ground and could cause injury.

1.3.2 Precautions

1. Do not expose the *PowerPro* controller to moisture, operate in wet areas, or place liquids on or above the controller.

2. Handpieces are factory sealed. **Do not** disassemble or lubricate, as this may void the warranty. There are no user-serviceable parts inside.

3. Use only associated ConMed Linvatec attachments and accessories (saw blades, bits, etc.) as defined within the descriptions of each attachment.

4. All associated Tubing Sets are latex free.

5. Tubing sets contain the phthalate plasticizer DEHP, which may leach into the patient during administration of irrigant. Animal studies have shown that high-level exposure to DEHP may affect male fertility and reproductive development; these findings have not been confirmed in clinical studies. In determining use of this device in a child, or a pregnant or nursing female, the clinical benefits should outweigh any potential risk to the infant.

6. Handle all equipment carefully. If any equipment is dropped or damaged in any way, return it immediately for service.

7. Prior to each use, perform the following:
   - Inspect all equipment for proper operation.
   - Ensure all attachments and accessories are correctly and completely attached to the handpiece.
   - Perform the required Performance Tests for each associated handpiece prior to each use.

8. Do not excessively bend or kink the instrument handpiece cord or power cord. Always inspect cords for signs of excessive wear or damage, or bent, broken or missing pins within the connector(s). **If any wear or damage is found, discontinue use and replace immediately.**

9. Do not handle the controller, handpieces or footswitch by the cord. Do not pull on the cord to remove it from the handpiece or controller.

10. Never operate the *MicroChoice*® Elite™ High Speed Drill (5020-025) Medium Speed Drill (5020-021) or the CoolFlex®

High Speed Drill (E9010) without a bur and appropriate bur guard in place and the **collet locked**. Damage will occur.

11. Running the shaver blade or bur without fluid flow (dry) may cause damage to the device.
12. Ensure the optical cassette sensor next to the pump cassette mechanism is kept clean at all times.
13. Do not stall handpieces, damage can occur.
14. Always inspect for bent, dull or damaged burs, blades or drill bits before each use. Do not attempt to straighten or sharpen. Do not use if damaged. After use, dispose of properly.

15. Always use a bur of the proper length for the particular guard.
16. Direct contact of the rotating cutting edge of shaver blades and burs with metallic surfaces and/or other hard surfaces such as arthroscopes, cannulas, or other instruments can cause damage to the devices. If contact does occur, shaver blades can break, seize, or shed metal particles. Shaver blade or bur should be examined for damage and replaced if necessary.
17. Do not apply excessive loading on the shaver blade or bur. Cutting performance is not increased with force. Excessive force or using shaver blades or burs as a lever can cause damage to the device including permanent deformation, shedding of metal (wear), and seizure.
18. If shaver blade clogs, use ConMed Linvatec Declogger (E9315) to declog shaver blade. Shaver blades or burs may also be declogged by removing inner assembly from outer assembly and clearing any tissue from the window or aspiration hole. DO NOT disassemble Prebent Shaver Blades with catalog number ending in "M" or "MT" (i.e., C9299M and 42ULT-ZZ-MT).
19. United States Federal law restricts sale of this device to or on the order of a physician. **Rx ONLY**
20. After each use, thoroughly clean the controller, handpieces, attachments and accessories (See **"4.1 Cleaning and Sterilizing" on page 118**).

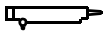
NOTES:

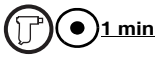
1. Observe all national waste management regulations.
2. Do not dispose of Waste Electrical and Electronic Equipment (WEEE) as unsorted municipal waste.

1.4 Symbol Definitions

Controller Markings	
	Stand-by (ON/OFF)
	Follow instructions for use.
	Precaution or warning notice
	Warning - For continued protection against risk of fire, replace only with the same type and rating fuse
	Mains Fuse
	Flammable Anesthetics - Risk of explosion if used in the presence of flammable anesthetics.
	Type B equipment
	Alternating Current
	Protective earth ground
	Waste Electronics and Electrical Equipment (WEEE) Symbol. Regarding European Union end-of-life of product.
Rx ONLY	Caution: Federal Law restricts this device to sale by or on the order of a physician.
	Footswitch Connection

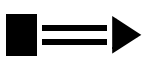
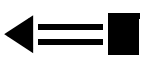
	Speed (rpm) Selection
	E9000 Series Handpiece Connection
	MicroChoice Drills and Saws Connection
	MicroChoice, Advantage, and APEX Shaver Handpiece Connection
	PowerPro Handpiece Connection
	Irrigation (Flow) Control
	Speed (rpm) Selection
	Adjustment to a maximum (Increase)
	Adjustment to a minimum (Decrease)
PRESET	Predetermined setting for irrigation flow using the CoolFlex High Speed Drill with the E9414 Tubing Set
RPM	Revolutions Per Minute
Max	Maximum Operating Speed
Min	Minimum Operating Speed

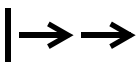
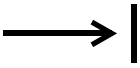
Footswitch Markings	
	Shaver Handpieces
	Directional Selection (Forward/Reverse/Oscillate)
	Variable Speed, ON/OFF
	MicroChoice or Hall Handpiece
	Forward Variable Speed
	Reverse Variable Speed
	Oscillate
Mini-Driver™ Handpiece Markings	
	Indicates the safe or off position (only for a part of equipment) of the handpiece safety switch
	Indicates the on or run position (only for a part of equipment) of the handpiece safety switch
F	Indicates on in the forward, or clockwise, direction of rotation
R	Indicates on in the reverse, or counterclockwise, direction of rotation

	Duty Cycle: 1 minute on
	Duty Cycle: 3 minutes off

Miscellaneous Markings	
	Single Use Only
	Latex Free
	Eye Protection Required
	No user service recommended. Refer servicing to qualified ConMed Linvatec service personnel.
	Indicates product component should not be sterilized.
	Indicates product component should not be immersed in any type of fluid.
	Indicates handpiece should not be immersed in any fluid.
	Indicates product should not be oiled or lubricated.
	Lock
	Unlock
	Indicates blade collet unlock position of the D9820, D9824, D9920 and D9924 Advantage and Advantage Turbo Handpieces
	Indicates Handpiece increase
	Indicates Handpiece decrease

	Do not resterilize
	DEHP Symbol
	WEEE Symbol

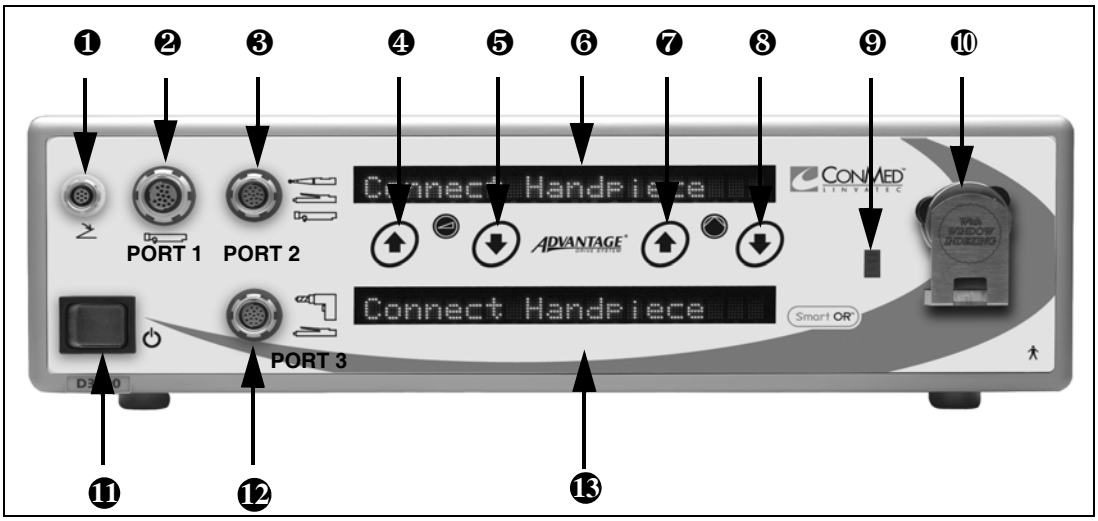
Graphical Display Symbols	
	Drill - forward direction
	Drill - reverse direction
	OscDrill - oscillate function
	Tap - forward direction
	Tap - reverse direction
	**Screw - forward direction**
	**Screw - reverse direction**
	Irrigation message symbol
	Saw operating symbol
	Handpiece “Aspirate Mode” symbol
	Handpiece in “safe” position

	**Handpiece “Motor Overspeed” message symbol**
	**Handpiece “Stalled” and “Maximum Torque” messages symbol**
	Handpiece “Magnetic Field” message symbol
????	**Check Handpiece message**

1.5 Environmental Directives

WEEE Directive [2002/96/EC] on Waste Electrical and Electronic Equipment. This statement only applies to European countries with regard to the Waste Electrical and Electric Equipment (WEEE) European Directive.

The WEEE symbol on the product or its packaging indicates that this product must not be disposed of with other waste. Instead, it is your responsibility to dispose of your waste equipment by handing it over to a designated collection point for the recycling of Waste Electrical and Electronic Equipment. The separate collection and recycling of your waste equipment at the time of disposal will help conserve natural resources and ensure that it is recycled in a manner that protects human health and the environment. For more information about where you can drop off your equipment at the end of its useful life for recycling, please contact ConMed Linvatec.



1.6 System Indicators

1.6.1 Advantage Controller Front Panel (Top Portion)

1. **Footswitch Receptacle —** Accepts the footswitch cord connector.

2. **APEX Handpiece Receptacle (Port 1)** — Directly accepts the handpiece cord connector of any APEX handpiece (C9820, C9824, C9828, C9840).

3. **Handpiece Receptacle (Port 2)** Directly accepts the handpiece cord connector of the following handpieces; all Group 1 Handpieces (E9005, E9015, and CoolFlex); all Group 2 Handpieces (5020-021, -022, -023, -024, -025, -026, -027); most Group 3 Handpieces (D9820, D9920, MC9820, D9824, D9924, MC9828, and MC9840); and the *PowerPro* PRO2300E and PRO6125 Oscillator Saws, PRO6100 Electric II Modular Handpiece, and PRO6135 Reciprocator Saw. However, with the addition of a handpiece adapter - the APEX Adapter (E9320) or the Mini-Driver Adapter (K501) - this receptacle will also accept and operate the following shaver handpieces (C9820, C9824, C9828, C9840) or the Mini-Driver Handpiece (K500).

NOTES:

- **All cord receptacles and connectors are keyed to prevent incorrect insertion. Likewise, receptacles and connectors are color-coded to easily recognize where to connect each cord (footswitch receptacle and connector - yellow, handpiece receptacles and connectors - red or grey).**

- **Only one handpiece can be connected at a time in either port of the top section. If a handpiece is connected while another handpiece is already connected, "CHECK HANDPIECE" will display. BOTH handpieces must be removed to clear the fault condition.**

- **The *PowerPro* Electric Modular (PRO2100E) and Two-Trigger (PRO2200E) handpieces will NOT operate in Port 2. If these handpieces are connected to Port 2, "INVALID HANDPIECE" will display.**

4. **Speed Increase Button -** Press to increase the handpiece speed for handpieces connected to Port 1 or Port 2.

5. **Speed Decrease Button -** Press to decrease the handpiece speed for handpieces connected to Port 1 or Port 2.

6. **Top Display** — Displays handpiece speeds, irrigation flow rates, instructions, operating modes and error messages. Displays actual speed while the handpiece is operating, and the set speed when the handpiece is inactive. Flow rate, as a percentage, displays when the pump is enabled.

7. **Flow Increase Button —** Press to increase the pump flow rate for handpieces connected to Port 1 or Port 2.

8. **Flow Decrease Button —** Press to decrease the pump flow rate for handpieces connected to Port 1 or Port 2.

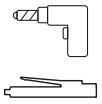
9. **Optical Sensor —** Senses whether or not a tubing set is connected.

10. **Tubing Cassette Receptacle —** Accepts the various tubing sets. See **"6.1 Handpieces, Attachments and Accessories" on page 149** for a list of associated tubing sets.

1.6.2 Advantage Controller Front Panel (Bottom Portion)

11. **Standby Power Switch —** To activate the controller, place this switch to the on position. To set the controller to stand-by mode, place this switch to the off position.

12. **Handpiece Receptacle (Port 3)** Directly accepts all *PowerPro* handpieces along with several other handpieces. With the addition of a handpiece adapter - Mini-Driver Adapter (K501) or APEX Adapter (E9320) - this receptacle will also accept and operate the Mini-Driver Handpiece (K500) or two of the four APEX handpieces (C9824 and C9828).



NOTE: Even though this handpiece receptacle (Port 3) will accept the connectors of the E9000 Series handpieces (E9005, E9015, and CoolFlex), the *MicroChoice* Low Speed Drill (5020-026), the *MicroChoice* Shaver Handpieces (MC9820, MC9840), and the Advantage Basic Shaver Handpieces (D9820, D9920), they cannot be activated in this port because a footswitch is required for activation of these handpieces and there is no footswitch port for the bottom portion of the controller.

13. **Bottom Display —** Displays the following information in text or graphical format (Reference **"2.1.3.9 Switch 5 - Display Mode Selection" on page 45**); user/error messages, instructions, handpiece speeds, and operating modes. Displays the actual speed while the handpiece is operating and set speed when the handpiece is inactive.

1.6.3 Advantage Controller Back Panel

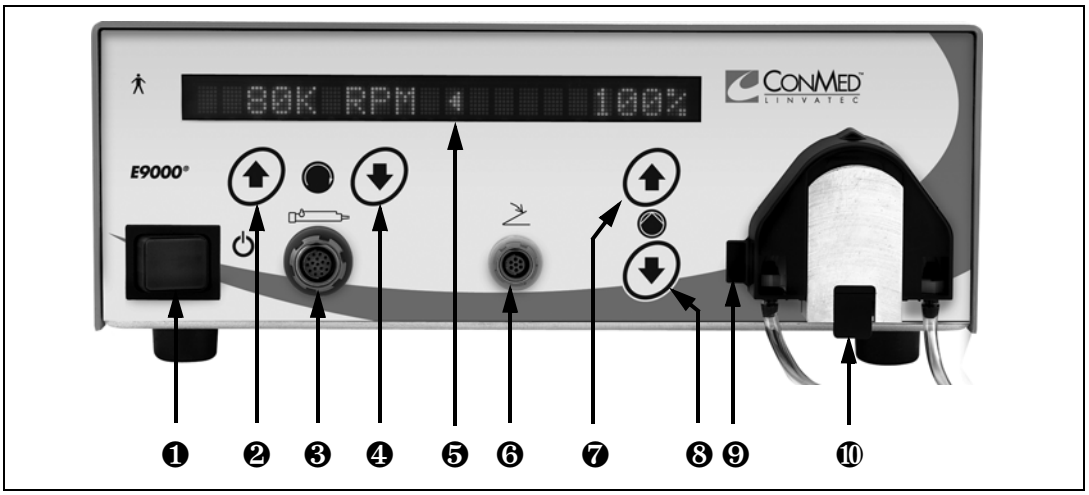
1. **Speaker —** Used for the output of audible information.

2. **"TOP CONTROLLER OPTIONS" Switches —** Used to set specific controller functionality settings for the top portion of the controller; i.e., Day-to-Day Memory, Footswitch Operating Mode, Audio Mode, Handpiece Oscillate Operating Mode, Window Indexing Mode, Handpiece Default Setting Mode, and Handpiece Button Enable/Disable Mode (See **"2.1.3 Controller Options/Function Switches and Settings" on page 36**).

3. **"BOTTOM CONTROLLER OPTIONS" Switches —** Used to set specific controller functionality settings for the bottom portion of the controller; i.e., Day-to-Day Memory, Handpiece Oscillate Operating Mode, Default or Swiss Handpiece Operating Mode, and Display Mode (See **"2.1.3 Controller Options/Function Switches and Settings" on page 36**).

4. **Mains Receptacle —** Accepts the supplied hospital grade power cable to provide AC power.

5. **Voltage Selection Means —** Used to set the controller to the appropriate voltage source (See **"4.4 Fuse Replacement and Voltage Selection Means" on page 130** for more information). **NOTE: Does not apply to the model D3000J controller**.



1.6.4 E9000 Controller Front Panel

1. **Standby Power Switch —** To activate the controller, place this switch to the on position. To set the controller to stand-by mode, place this switch to the off position.

2. **Speed Increase Button —** Press to increase the handpiece speed.

3. **Handpiece Receptacle —** Accepts the handpiece cord connector of all Group 1, Group 2, and Group 3 handpieces, and several *PowerPro* handpieces (PRO2300E, PRO6100, PRO6125, PRO6135). Also, using one of two handpiece adapters - Mini-Driver Adapter (K501) or APEX Adapter (E9320) - the Mini-Driver Handpiece or any of four APEX handpieces can also be connected.

NOTE: All cord receptacles and connectors are keyed to prevent incorrect insertion. Likewise, receptacles and connectors are color-coded to easily recognize where to connect each cord.

4. **Speed Decrease Button —** Press to decrease the handpiece speed.

5. **Display** — Displays handpiece speeds, irrigation flow rates, instructions, operating modes and error messages. Displays actual speed while the handpiece is operating and the set speed when the handpiece is inactive. Flow rate, as a percentage, displays when the pump is enabled.

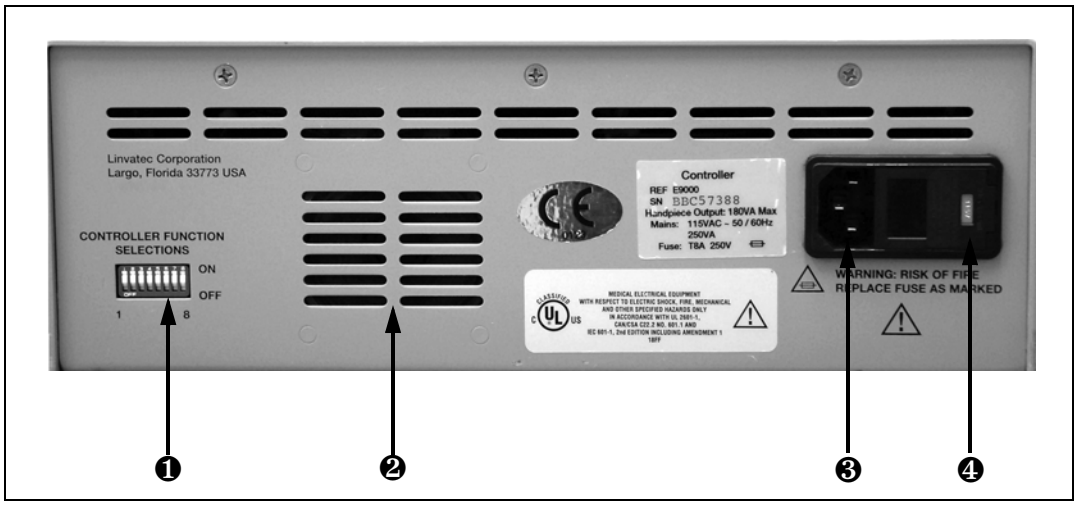
6. **Footswitch Receptacle —** Accepts the footswitch cord connector.

7. **Flow Increase Button —** Press to increase the pump flow rate.

8. **Flow Decrease Button —** Press to decrease the pump flow rate.

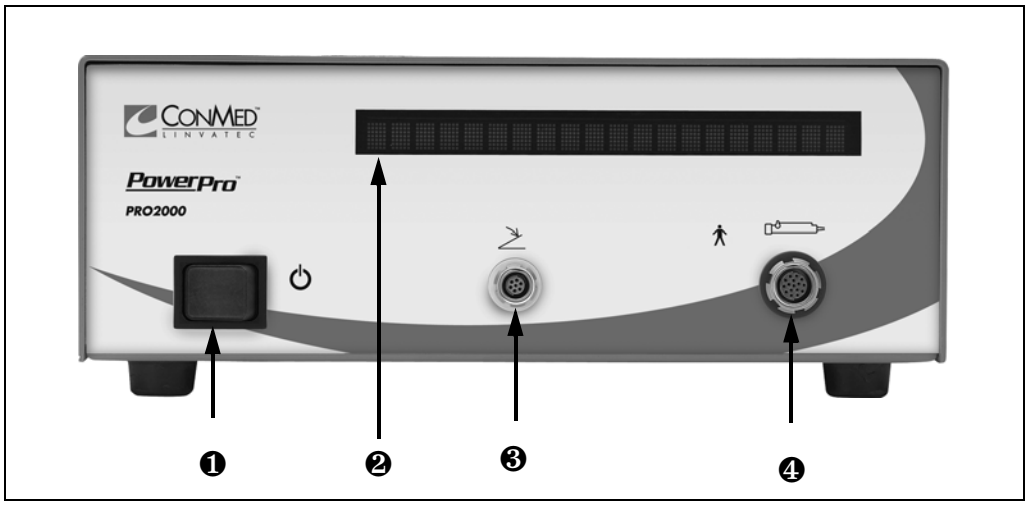
9. **Optical Sensor —** Senses whether or not a tubing set is connected.

10. **Tubing Cassette Receptacle —** Accepts the various tubing sets. See **"6.1 Handpieces, Attachments and Accessories" on page 149** for a list of associated tubing sets.



1.6.5 E9000 Controller Back Panel

1. **"CONTROLLER FUNCTION SELECTIONS" Switches —** Used to set specific controller functionality settings; i.e., Day-to-Day Memory, Footswitch Operating Mode, Audio Mode, and Handpiece Oscillate Operating Mode (See **"2.1.3 Controller Options/Function Switches and Settings" on page 36**).
2. **Speaker —** Used for the output of audible information.
3. **Mains Receptacle —** Accepts the supplied power cable to provide AC power.
4. **Voltage Selection Means —** Used to set the controller to the appropriate voltage source (See **"4.4 Fuse Replacement and Voltage Selection Means" on page 130** for more information). **NOTE: Does not apply to the model E9000J controller**.



1.6.6 *PowerPro* Controller Front Panel

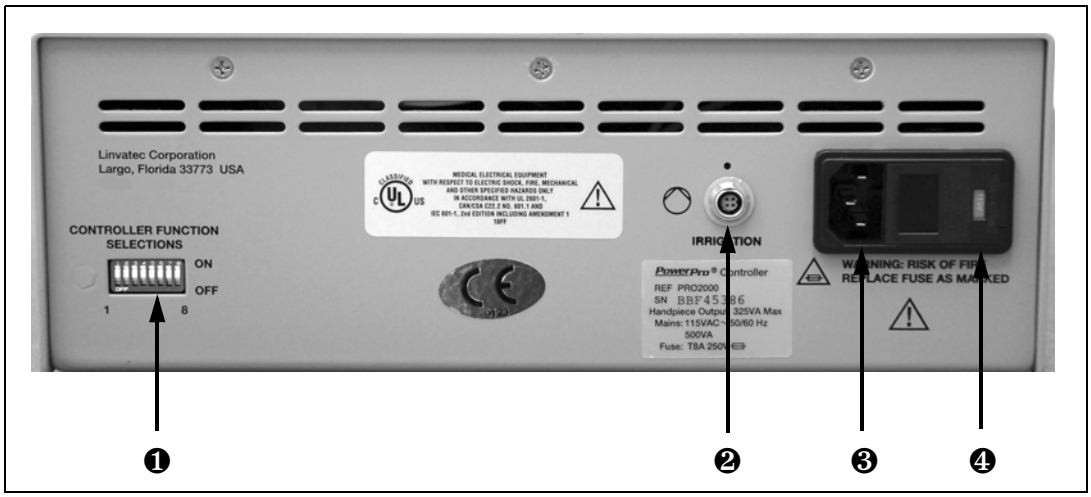
1. **Standby Power Switch —** To activate the controller, place this switch to the on position. To set the controller to stand-by mode, place the switch in the off position.

2. **Display —** Displays the following information in text or graphical format; user/error messages, instructions, handpiece speeds, and operating modes. Displays the actual speed while the handpiece is operating and set speed when the handpiece is inactive (See **"2.1.3.9 Switch 5 - Display Mode Selection" on page 45**).

3. **"FOOTSWITCH" Receptacle —** Accepts the footswitch cord connector.

4. **"HANDPIECE" Receptacle —** Accepts various handpiece cord connectors, the Mini-Driver Adapter (K501) or the APEX Adapter (E9320).

NOTE: All handpiece and footswitch receptacles and connectors are keyed to prevent incorrect insertion. Likewise, receptacles and connectors are color-coded to easily recognize where to connect each cord.



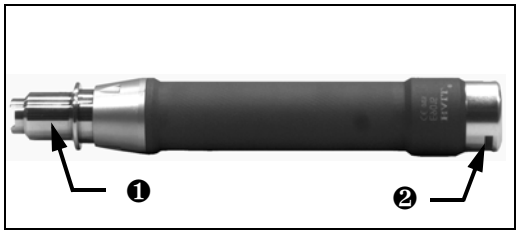
1.6.7 *PowerPro* Controller Back Panel

1. **"CONTROLLER FUNCTION SELECTIONS" Switches —** Used to set specific controller functionality settings; i.e., Day-to-Day Memory, Footswitch Operating Mode, Handpiece Oscillate Operating Mode, Default or Swiss Handpiece Operating Mode, and Display Mode (See **"2.1.3.1 Controller Options/ Function Switch Settings" on page 37**).
2. **"IRRIGATION" Receptacle —** Accepts the Irrigation Cord connector of a Hall Irrigation Pump.
3. **Mains Receptacle —** Accepts the supplied power cable to provide AC power.
4. **Voltage Selection Means —** Used to set the controller to the appropriate voltage source (See **"4.4 Fuse Replacement and Voltage Selection Means" on page 130** for more information).

1.7 Handpieces

1.7.1 GROUP 1 HANDPIECES

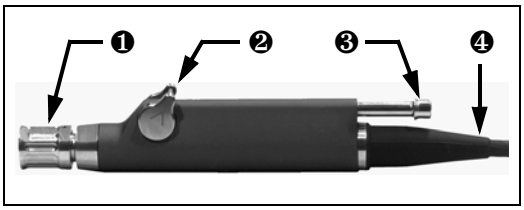
1.7.1.1 Cranial Perforator Drive Handpiece (E9015)



The E9015 Cranial Perforator Drive is used to operate clutch style cranial perforator cutters. It is equipped with a Hudson shank chuck. This handpiece can only be operated by the footswitch.

1. **Hudson Chuck—** Locks a perforator cutter into place.
2. **Handpiece Cord Connector —** The handpiece cord connects here to provide power to the handpiece. Uses the MC5056 or MC5057 Handpiece Cords.

1.7.1.2 High Speed Shaver (E9005)

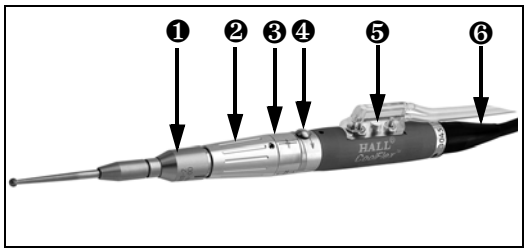


The E9005 High Speed Shaver Handpiece is a balanced, lightweight, sealed assembly designed to operate shaver blades and burs for resection of bone and soft tissue (Use only Series A, E, N, and appropriate C shaver blades and burs).

A maximum operating speed of 10,000 rpm in forward and reverse and 5,000 rpm in single-turn and multi-turn oscillate are attainable [See **“2.1.3.6 Switch 4 - Oscillate Mode Selection (Shaver Handpieces Only)” on page 42**]. This handpiece can only be operated by the footswitch.

1. **Locking Collet —** Provides simple and fast insertion and removal of a shaver blade or bur. The collet allows the shaver blade to be inserted in any position.
2. **Suction Port Valve —** Manually controls suction flow.
3. **Suction Port —** Connects to the suction line for aspiration.
4. **Integrated Handpiece Cord —** Attaches the handpiece to the controller.

1.7.1.3 CoolFlex High Speed Drill (E9010)

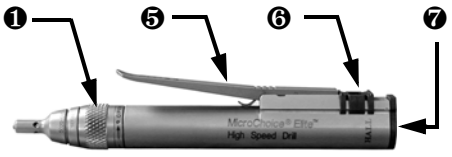


The CoolFlex High Speed Drill is designed for resection of bone. It incorporates an integral angling capability that allows the surgeon to change the angle between the main handpiece body and the bur guard from 0° to 20° without the use of a separate angle attachment.

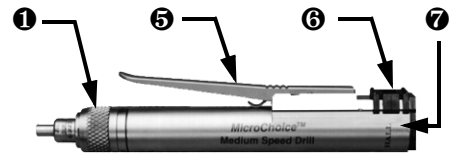
This drill is used in conjunction with the E9414 or E9415A Tubing Sets to provide cooling for the handpiece body. The E9415A Tubing Set also provides irrigation to the surgical site. This handpiece can only be operated by the footswitch.

PRECAUTION: Cooling for the handpiece body is recommended at all times. When using the E9414 Tubing Set, the tubing line MUST be fully primed or the handpiece will overheat, which will cause damage to the handpiece (see “ E9414 Tubing Set with Recirculation only:” on page 69 for information on priming the tubing set).

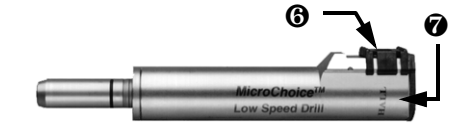
1. **Guard Collet —** Accepts bur guards and neuro guards for various burs.
2. **Bur Lock Collar —** Twist the bur lock collar counterclockwise to open the collet to insert a bur. Twist clockwise to lock the bur in place.
3. **Swivel Sleeve —** Twist to change the angle of the main handpiece body and the bur from 0° to 20°.
4. **Angle Locking Button** — Locks the swivel sleeve in position. Slide the button to unlock the swivel sleeve and rotate it to the 0° or 20° position. Once completely in position the locking button will snap into place and lock the swivel sleeve in the desired angle.
5. **Tubing Set Cassette Holder —** Accepts the handpiece cassette of the tubing set.
6. **Integrated Handpiece Cord —** Attaches the handpiece to the controller.



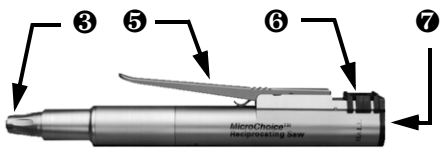
Elite High Speed Drill (5020-025)



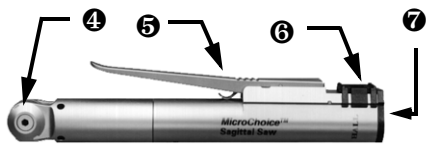
Medium Speed Drill (5020-021)



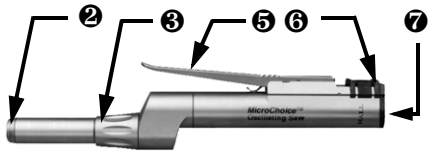
Low Speed Drill (5020-026)



Reciprocating Saw (5020-023)



Sagittal Saw (5020-022)



Oscillating Saw (5020-024)

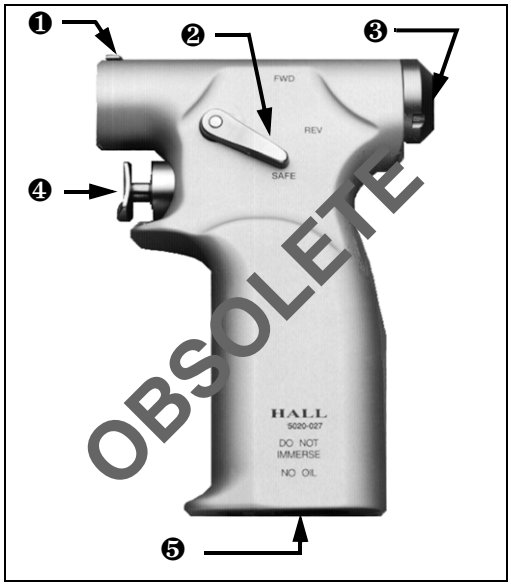
1.7.2 GROUP 2 HANDPIECES

1.7.2.1 *MicroChoice* Drills and Saws

1. **Bur Lock Collar —** Rotate to lock or unlock a bur.
2. **Blade Collet —** Holds the blade in place.
3. **Blade Lock Collar —** Rotate to open or lock the blade collet.
4. **Collet Lock Mechanism —** Locks a blade into place.
5. **Activation Lever —** Depress to operate the handpiece. The activation lever can be removed for leverless operation (Reference **“3.5.4 Leverless Handpiece Operation” on page 87**).
6. **Safe/Run Slide —** Place in the “SAFE” position prior to inserting or removing attachments and/or accessories (blades, bits, burs) and when the handpiece is not in use. Place in the “RUN” position to activate the handpiece.
7. **Handpiece Cord Connector —** The handpiece cord connects here to provide power to the handpiece. Uses the MC5056 or MC5057 Handpiece Cords.

NOTE: The Low Speed Drill can only be operated by the footswitch and will not operate on the bottom portion of the Advantage Controller.

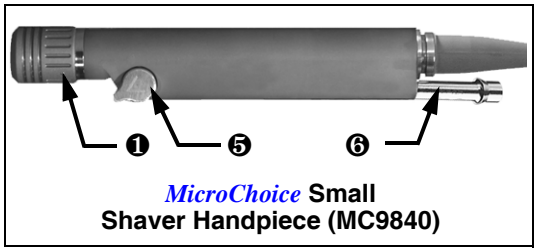
1.7.2.2 *MicroChoice* Modular Handpiece (5020-027)



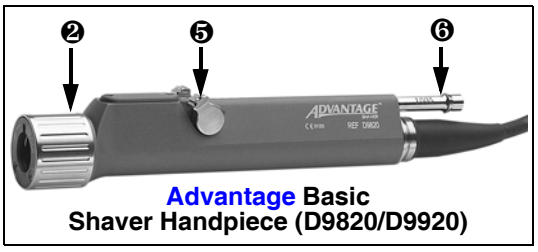
The *MicroChoice* Modular Handpiece is designed to be used as an all-purpose driver for reaming, drilling, wire and pin driving, and, with proper attachments will perform sawing applications. This handpiece is designed to accept all the attachments starting on page 88.

1. **Attachment Slide-Lock —** Locks attachments in place. Slide in the direction of the arrow to remove attachment.
2. **Thumb Lever —** Used to place the handpiece in the safe mode or an operating mode. Place in the "SAFE" position prior to connecting or removing any attachment or accessory and during non-use of the handpiece. Place in the "FWD" position to operate in the forward direction. Place in the "REV" position to operate in the reverse direction.
3. **Wireguard Receptacle —** Insert a wire through this receptacle. Will also accept a wire guard accessory (5053-123) to prevent long wires from bending.
4. **Activation Trigger —** Used to activate the handpiece. Depress when the thumb lever is in the "FWD" or "REV" position.
5. **Handpiece Cord Connector —** The handpiece cord connects here to provide power to the handpiece. Uses the MC5056 or MC5057 Handpiece Cords.

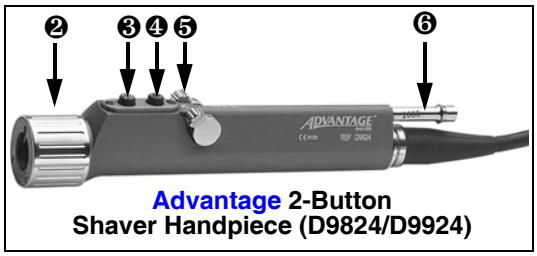
NOTE: The Modular Handpiece does not operate with the footswitch.



MicroChoice Small
Shaver Handpiece (MC9840)



Advantage Basic
Shaver Handpiece (D9820/D9920)



Advantage 2-Button
Shaver Handpiece (D9824/D9924)

1.7.3 GROUP 3 HANDPIECES

NOTE: The following shaver handpieces are not shown and are no longer sold, but operate on the Advantage Controller; C9820, MC9820, C9824, C9828, MC9828, C9840.

1.7.3.1 Shaver Handpieces

The Basic (MC9820, C9820, D9820, D9920), 2-Button (C9824, D9824, D9924), and Full-Function (MC9828, C9828) Shaver Handpieces are equipped with sensors that automatically select the proper speed range for the attached blade.

The 2-Button Shaver Handpiece is equipped with ON/OFF and Forward/Reverse/Oscillate buttons for fingertip control. The Full-Function Shaver Handpieces, in addition to the ON/OFF and Forward/Reverse/Oscillate buttons, also have Speed Increase and Decrease buttons.

The Small Shaver Handpieces (MC9840, C9840) are designed to operate burs and shaver blades for resection of bone and soft tissue. They are equipped with a quick-connect, blade-locking collet that rotates 360° for cutter window positioning. A maximum operating speed of 5,000 rpm in forward and reverse and 2,500 rpm in single-and multi-turn oscillate are attainable.

For more information about oscillation instructions, see **“2.1.3.6 Switch 4 - Oscillate Mode Selection (Shaver Handpieces Only)” on page 42**.

1. **Blade Rotatable Locking Collet (MC9840 only) —** Provides simple and fast insertion and removal of the blade. Retract the locking collet towards the back of the handpiece and insert the blade hub. Release the locking collet and the blade is securely locked in place. Allows 360° positioning of the blade cutting window.

2. **Blade Locking Collet (D9820, D9824, D9920, D9924 only) —** Accepts a cutter blade. Simply insert the blade hub and push to lock into place. Remove by rotating the collet in the direction of the arrow and pulling out the blade.

3. **Direction Select Button —** Press and release to select the direction of blade rotation between Forward, Reverse and Oscillate while the handpiece is operating or inactive.

4. **ON/OFF Button —** Press and release this button to turn the shaver handpiece motor on. Press again to turn off.

   This button is also associated with "Window Indexing". When "Window Indexing" is enabled with DIP Switch 5 on the top section of the controller, the "ON/OFF" button is used to "index" or position the cutting window so it stops in the same position each time the blade stops, i.e., where it starts is where it stops. See **"2.1.3.8 Switch 5 - Window Indexing" on page 44**.

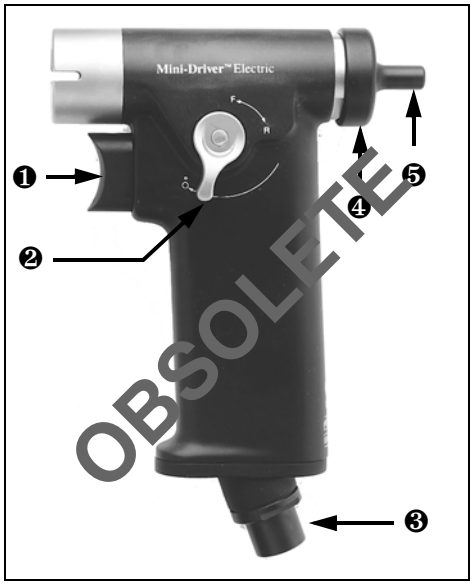
   Advantage and APEX Handpieces ONLY (D9824, D9924, C9824 and C9828) — The "Direction" and "ON/OFF" button function can be changed to increase and decrease speed, respectively. To change the function of the buttons, press and hold the Direction button when the handpiece is NOT operating. The controller will "beep" twice to indicate that the handpiece button function has changed. Press the Direction button to increase the handpiece speed. Press the "ON/OFF" button to decrease the handpiece speed. When no further speed change is requested, the controller will "beep" twice again indicating that the button function has returned to its original function.

5. **Suction Port Valve —** Manually controls suction flow.

6. **Suction Port —** Connects to the suction line for aspiration.

1.7.4 GROUP 4 HANDPIECES

1.7.4.1 Mini-Driver Electric Handpiece (K500)



OBSOLETE

The Mini-Driver Handpiece, combined with the many available attachments; reaming, drilling, wire and pin driving, and, with reciprocator and sagittal attachments can perform sawing applications. This handpiece is a versatile and all-purpose handpiece powerful enough to handle procedural requirements from a bunionectomy to an ACL procedure. The Mini-Driver handpiece will accept all the attachments listed on pages 102 through 111.

1. **Activation Trigger —** Used to activate the handpiece when the directional control lever is in either forward (F) or reverse (R).
2. **Safety/Directional Control Lever** Used to place the handpiece in the safe/off position when connecting attachments or installing accessories. Also used to place the handpiece in an operating direction, either forward (F) or reverse (R).
3. **Handpiece Cord Connector —** The handpiece cord connects here to provide power to the handpiece. Uses the M334 Handpiece Cord.
4. **Attachment Lock/Release Collet —** Push inward to connect an attachment. Release to lock attachment in place.
5. **Cannulation —** Used to stabilize long wires or pins.

NOTE: The Mini-Driver Handpiece does not operate with the footswitch or integrated console pump.

1.8 Footswitches

NOTE: Either footswitch, the 2-Pedal or 3-Pedal, will operate handpieces using the E9000, Advantage and *PowerPro* controllers. However, when used with the Advantage controller, it will only operate handpieces connected to Port 1 or Port 2 on the top portion of the controller, excluding the *MicroChoice* Modular Handpiece (5020-027) and the Mini-Driver Handpiece (K500).

1.8.1 Footswitch, 2-Pedal (5020-053)

When a handpiece is attached to the controller, the firmware senses the particular handpiece connected and programs the footswitch to operate accordingly.

NOTE: All handpieces can be set to operate in either the ON/OFF or Variable Speed mode by setting the specific "CONTROLLER OPTIONS" switch on the back of the controller [Reference "2.1.3.3 Switch 2 - Footswitch Mode Selection" on page 40 for more information].

1.8.1.1 Operation with the E9005 High Speed Shaver and Group 3 Shaver Handpieces

1. **Left Pedal —** Changes the handpiece operating direction between Forward, Reverse and Oscillate.
2. **Right Pedal —** Activates the shaver handpiece in the selected direction.

   "Window Indexing" is enabled with DIP Switch 5 on the E9000 Controller and the top section only of the Advantage controller (see **"2.1.3.8 Switch 5 - Window Indexing" on page 44**). The footswitch right pedal is used to "index" or position the blade cutting window so that it stops in the same position each time the blade stops.

1.8.1.2 Operation with the CoolFlex High Speed Drill and Group 2 Drills

1. **Left Pedal —** Activates the handpiece in the Reverse direction.
2. **Right Pedal —** Activates the handpiece in the Forward direction.

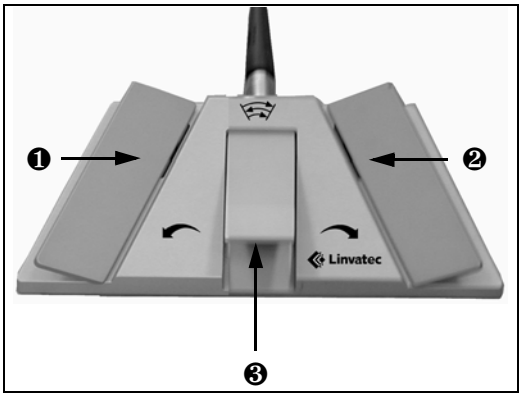
NOTE: There is no oscillate mode with these drills.

1.8.1.3 Operation with Group 2 Saws and E9015 Cranial Perforator Drive

NOTE: There is no direction selection or oscillate mode while using these handpieces.

1. **Left Pedal —** Activates the handpiece.
2. **Right Pedal —** Activates the handpiece.

1.8.2 Footswitch, 3-Pedal (C9863)



When operating shaver handpieces, drills or saws, this footswitch can be set to operate in one of two modes; either ON/OFF or Variable Speed mode (Reference **“2.1.3.3 Switch 2 - Footswitch Mode Selection” on page 40** for information about making this selection).

1.8.2.1 Operation with the E9005 High Speed Shaver and Group 3 Shaver Handpieces

1. **Left Pedal —** Activates the shaver handpiece in the Reverse direction.
2. **Right Pedal —** Activates the shaver handpiece in the Forward direction.

   “Window Indexing” is enabled with DIP Switch 5 on the E9000 Controller and the top section only of the Advantage controller (see **“2.1.3.8 Switch 5 - Window Indexing” on page 44**). The footswitch right or left pedal is used to “index” or position the blade cutting window so that it stops in the same position each time the blade stops.
3. **Center Pedal —** Activates the shaver handpiece in oscillate mode (There is no variation of speed when operating in oscillate mode, simply full ON or OFF).

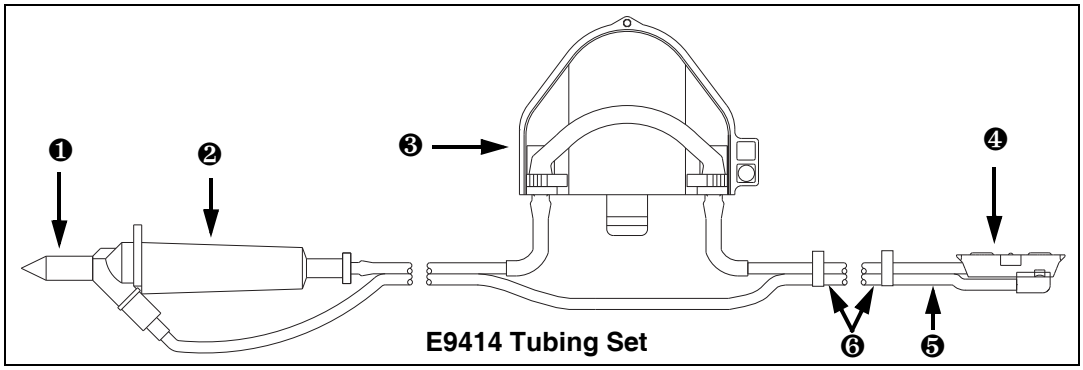
1.8.2.2 Operation with the CoolFlex High Speed Drill and Group 2 Drills

1. **Left Pedal —** Activates the handpiece in the Reverse direction.
2. **Right Pedal —** Activates the handpiece in the Forward direction.
3. **Center Pedal —** This pedal is inoperative using these drills.

1.8.2.3 Operation with Group 2 Saws and E9015 Cranial Perforator Drive

NOTE: There is no direction selection or oscillate mode while using these handpieces.

1. **Left Pedal —** Activates the handpiece.
2. **Right Pedal —** Activates the handpiece.
3. **Center Pedal —** This pedal is inoperative using these handpieces.



E9414 Tubing Set

1.8.3 Tubing Sets

Several tubing sets are available for use with the Advantage and E9000 Systems. Two are used with the CoolFlex High Speed Drill to provide handpiece cooling and/or surgical site irrigation. One is used to provide irrigation for shaver blades. One is used for all Group 2 *MicroChoice* Drills and Saws, except the Modular Handpiece (5020-027).

Tubing sets contain the phthalate plasticizer DEHP, which may leach into the patient during administration of irrigant. Animal studies have shown that high-level exposure to DEHP may affect male fertility and reproductive development; these findings have not been confirmed in clinical studies. In determining use of this device in a child, or a pregnant or nursing female, the clinical benefits should outweigh any potential risk to the infant.

Tubing sets are latex free.

Tubing sets are one-time use only. Properly dispose of tubing sets after use.

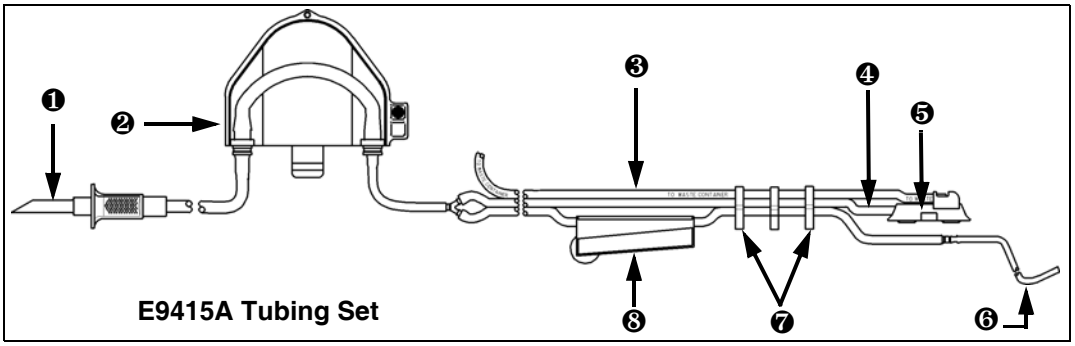
The ability to effectively clean and re-sterilize this single use device has not been established and subsequent re-use many adversely affect the performance, safety and/or sterility of the device.

1.8.3.1 Tubing Set without Bur Irrigation (E9414) for use with the CoolFlex High Speed Drill

The E9414 Tubing Set is used in conjunction with the CoolFlex Drill only to provide cooling for the handpiece body.

Cooling for the handpiece body is recommended at all times and is obtained from a supply of sterile fluid (water or saline) that is pumped to the body of the handpiece.

1. **Spike Line —** Connects to the fluid supply for fluid distribution to the surgical site.
2. **Priming Chamber —** Used to prime the tubing line.
3. **Cassette -** Attaches to the peristaltic pump of the controller to aid in fluid delivery.
4. **Handpiece Cassette —** Connects to the handpiece body to supply fluid for handpiece cooling. Also redirects fluid for recirculation back to the fluid supply.
5. **Recirculating Line —** Routes the fluid back to the supply bag for recirculation.
6. **Handpiece Cord Clips —** Used to attach the tubing to the handpiece cord.



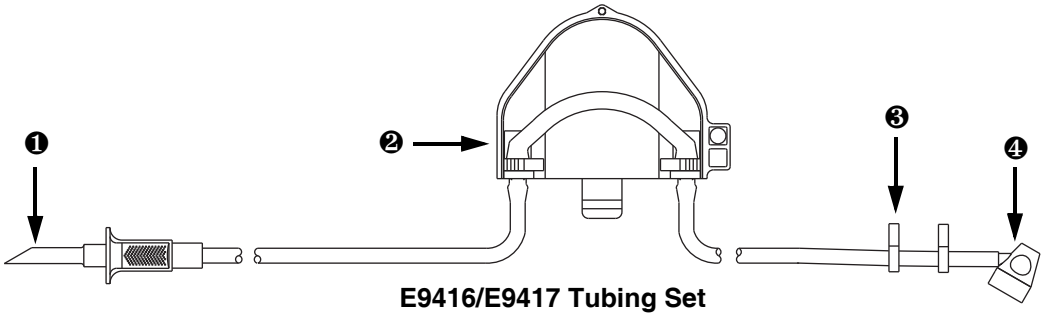
1.8.3.2 Tubing Set with Bur Irrigation (E9415A) for use with the CoolFlex High Speed Drill

The E9415A Tubing Set is used in conjunction with the CoolFlex High Speed Drill. It has an affixed irrigation tip that attaches to any of the bur guards used with the CoolFlex Drill. Its purpose is to provide cooling for the handpiece body and irrigation for the surgical site.

Cooling for the handpiece body is recommended at all times and is pumped from a supply of sterile fluid (water or saline) to the handpiece body.

A common fluid supply is used for cooling and lavage. However, separate fluid lines are incorporated in the tubing set to avoid mixing the cooling fluid with the lavage fluid.

1. **Spike Line —** Connects to the fluid supply for fluid distribution to the surgical site.
2. **Cassette —** Attaches to the peristaltic pump of the controller for fluid delivery.
3. **Discharge Line —** Routes the handpiece cooling fluid to the discharge bucket.
4. **Circulation Line —** Routes the fluid to the handpiece cassette where it is used for cooling the handpiece.
5. **Handpiece Cassette —** Connects to the handpiece body to supply fluid for handpiece cooling. Also redirects fluid to the discharge line.
6. **Irrigation Line and Tip —** Routes fluid through an affixed irrigation tip for irrigation of the surgical site.
7. **Handpiece Cord Clips —** Used to attach the tubing to the handpiece cord.
8. **Roller Clamp —** Used to adjust the fluid flow to the surgical site.

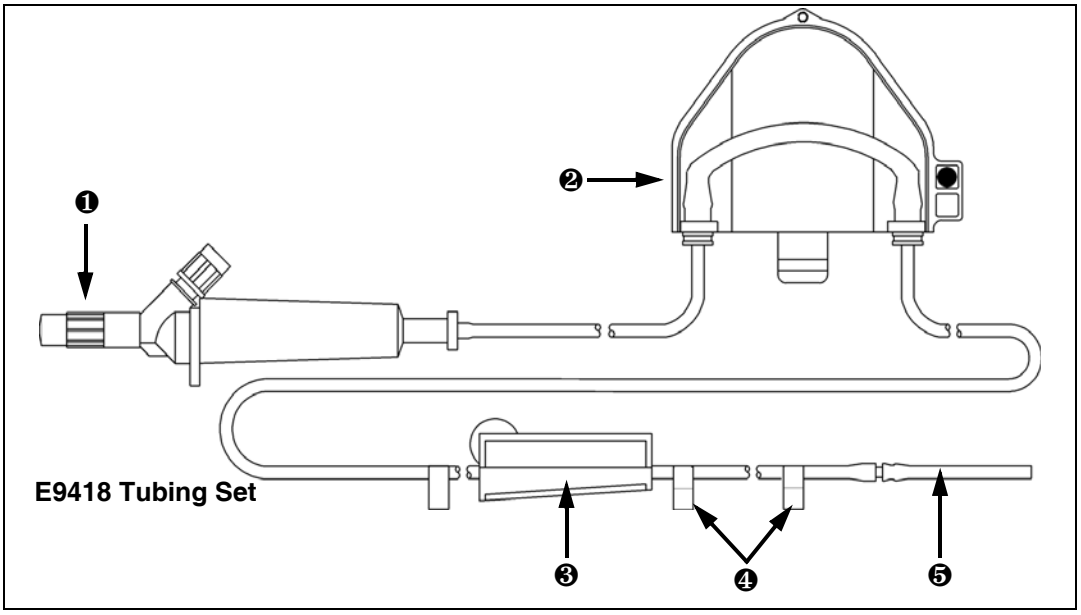


E9416/E9417 Tubing Set

1.8.3.3 Tubing Sets (E9416/E9417) for use with 3.7 mm and 4.2 mm Irrigated Shaver Blades

The E9416 (4.2 mm) and E9417 (3.7 mm) Tubing Sets are used to provide irrigation to irrigated shaver blades and burs.

1. **Spike Line —** Connects to the fluid supply for fluid distribution to the surgical site.
2. **Cassette —** Attaches to the peristaltic pump of the controller to aid in fluid delivery.
3. **Handpiece Cord Clips —** Used to attach the tubing to the handpiece cord.
4. **Irrigation Collar** — Attaches to the blade hub to allow fluid distribution to the surgical site.



1.8.3.4 Tubing Set (E9418) for use with Group 2 *MicroChoice* Drills and Saws

The E9418 Tubing Set is used to provide irrigation for blades, bits and burs while using any of the *MicroChoice* Group 2 Drills or Saws (excludes the *MicroChoice* Modular Handpiece, 5020-027).

1. **Spike Line —** Connects to the fluid supply for fluid distribution to the surgical site.
2. **Cassette —** Attaches to the peristaltic pump of the controller to aid in fluid delivery.
3. **Roller Clamp —** Used to adjust the fluid flow to the surgical site.
4. **Handpiece Cord Clips —** Used to attach the tubing to the handpiece cord.
5. **Irrigator Tip —** Accepts various irrigation tips (See **“6.1 Handpieces, Attachments and Accessories” on page 149**) for the Group 2 *MicroChoice* drills and saws for fluid distribution to the surgical site.

2.0 SYSTEM INSTALLATION and OPERATION

2.1 Installation and Setup

1. Plug the power cord into the controller receptacle and a properly earthed mains supply outlet (i.e., receptacle marked "Hospital Grade" or "Hospital Only").

2. If using irrigation, a fluid bag hanger rod (5040-180) is available to mount directly to the top of the controller (not on *PowerPro* controller). This hanger rod will hold a one liter fluid bag. To attach the hanger rod:

   (a) Remove the ConMed Linvatec sticker from the top of the controller.

   (b) Insert the threaded portion of the hanger rod into the hole. Turn clockwise until approximately 1/2" (12 mm) of the rod is threaded into the hole.

   (c) Secure the hanger rod in place by tightening the knurled lock nut.

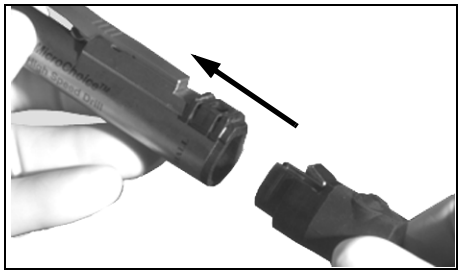
3. Hang the fluid bag on the arm of the hanger rod.

2.1.1 Handpiece Cord Installation

NOTE: Steps 1 and 2 apply to all handpieces with a detachable cord EXCEPT the K500 Mini-Driver Handpiece.

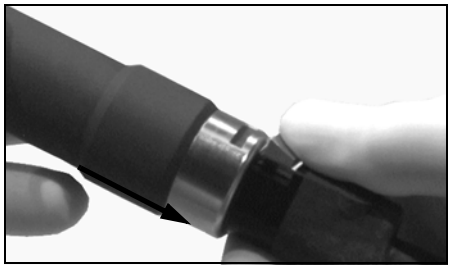
1. To attach the handpiece cord:

   (a) Ensure the handpiece is in the safe position, if applicable, prior to attaching the handpiece cord. Insert the handpiece cord into the cord receptacle of the handpiece. Push together until fully seated.



2. To remove the handpiece cord:

   (a) Press the latch and remove the cord from the handpiece.



NOTE: Step 3 applies ONLY to the K500 Mini-Driver Handpiece.

3. To attach the M334 handpiece cord to the K500 Mini-Driver Handpiece:

   (a) Grasp the handle of the handpiece and align the dot located on the handpiece cord with the dot located on the base of the handpiece cord connector.

   (b) Insert the handpiece cord into the handpiece cord connector. Push together until the cord and handpiece are fully seated.

2.1.2 Footswitch and Handpiece to Controller Installation

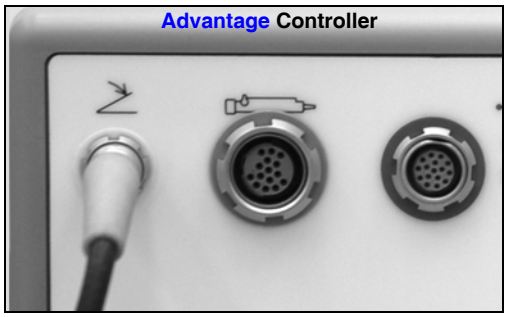
NOTES:

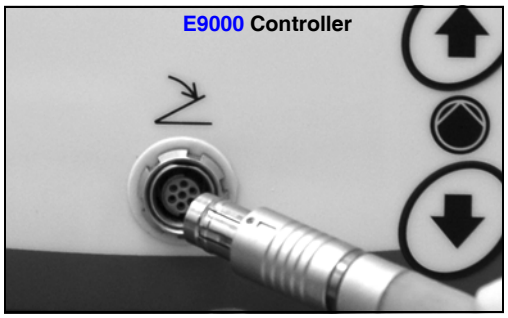
1. **Only one handpiece can be connected to the top portion of the Advantage controller at a time in its designated port, either Port 1 or Port 2. If a handpiece is connected to a top port while another handpiece is already connected, "CHECK HANDPIECE" will display. BOTH handpieces must be removed to clear the fault condition.**

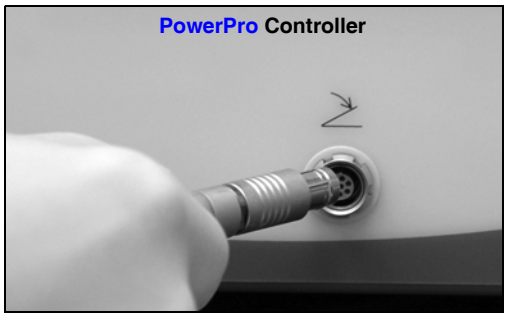
2. **If the handpiece console connector comes with a connector cap, it is essential that the connector cap is removed outside of the sterile field as sterility under the cap cannot be guaranteed.**

2.1.2.1 Connecting the Footswitch

1. If using a footswitch, position the red dot on the footswitch cord connector upward and insert it into the footswitch receptacle.





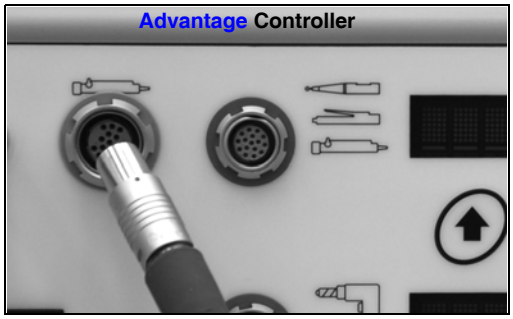


2.1.2.2 Connecting an APEX Handpiece

NOTE: The APEX handpieces consist of the C9820 Basic, C9824 Two Button, C9828 Full-Function, and C9840 Small Shaver handpieces.

1. If using the Advantage controller:

   (a) Plug the APEX handpiece cord connector directly into the APEX receptacle (Port 1) on the top portion of the controller.



2. If using the E9000 or *PowerPro* controller:

   (a) Plug the APEX handpiece cord connector into the female end of the E9320 APEX Adapter.

(b) Then, insert the male end of the adapter into the E9000 or *PowerPro* Controller handpiece receptacle.

E9000 Controller

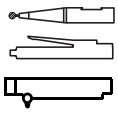
PowerPro Controller

2.1.2.3 Connecting all Group 1 and Group 2 Handpieces

NOTE: Group 1 and Group 2 handpieces consist of all E9000 and *MicroChoice* handpieces

1. If using the Advantage controller:

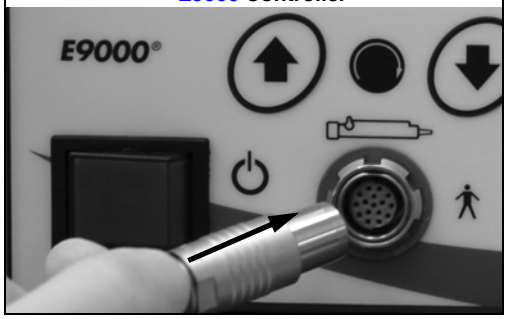
   (a) Plug the handpiece cord connector directly into the Port 2 receptacle on the top part of the controller.



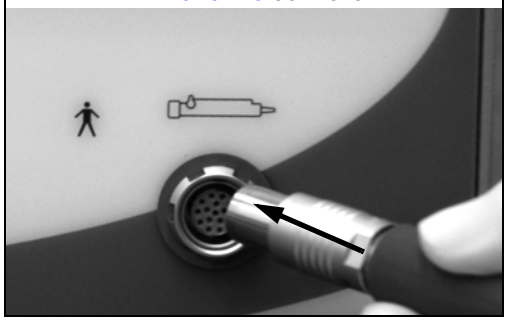
1. If using the E9000 or *PowerPro* controller:

   (a) Plug the handpiece cord connector directly into the handpiece receptacle.

E9000 Controller



PowerPro Controller



2.1.2.4 Connecting the Mini-Driver (K500) Handpiece

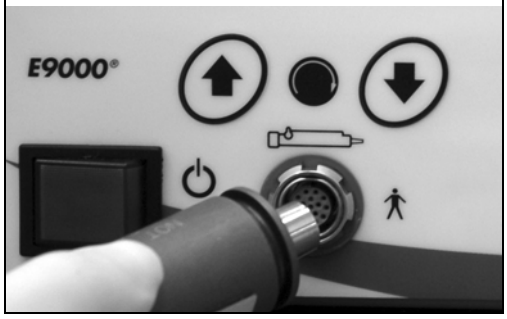
1. Plug the cord connector of the K500 Mini-Driver Handpiece into the female end of the K501 Mini-Adapter.

(a) If using the Advantage controller, position the red dot on the male end of the K501 Mini-Adapter upward and insert it into either the Port 2 (top) or Port 3 (bottom) receptacle.

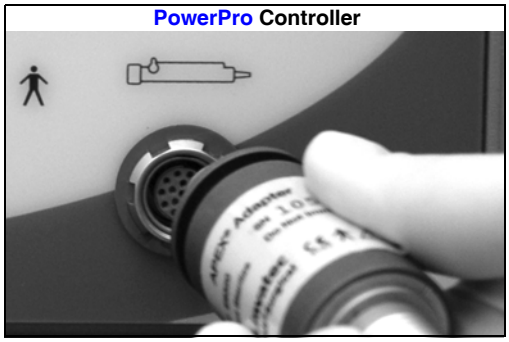
Advantage Controller

(b) If using the E9000 or *PowerPro* controller, position the red dot on the male end of the K501 Mini-Adapter upward and insert it into the handpiece receptacle.

E9000 Controller



PowerPro Controller



2.1.2.5 Connecting a *PowerPro* Handpiece

1. If using the Advantage controller:

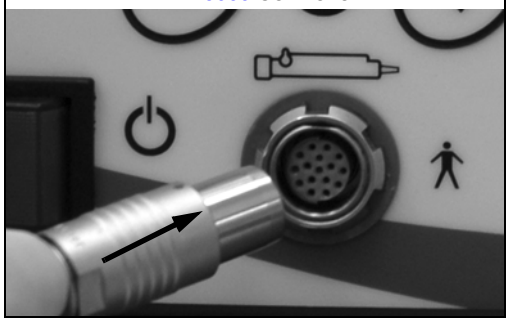
NOTE: The *PowerPro* Electric Modular (PRO2100E) and Two-Trigger (PRO2200E) Handpieces can only be operated from Port 3 on the bottom section of the Advantage controller.

   (a) Plug the *PowerPro* handpiece cord connector directly into the Port 2 or Port 3 receptacle of the controller.

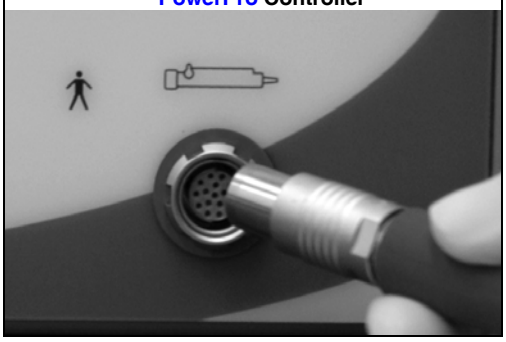
2. If using the E9000 or *PowerPro* controller:

   (a) Plug the *PowerPro* handpiece cord connector directly into the handpiece receptacle.

E9000 Controller



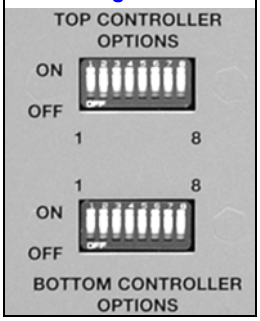
PowerPro Controller



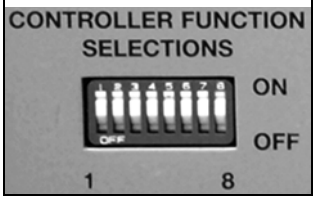
2.1.3 Controller Options/Function Switches and Settings

Before turning on the controller, set the "OPTIONS/FUNCTION" switches to the desired operating position. See pages 37 through 46 for an explanation of each switch function, how to set them, and their factory default settings.

Advantage Controller



E9000 and PowerPro Controller



NOTE: When viewing the switches, the operative position is determined by the indented portion of each switch. The related photo indicates all switches are currently set to the "OFF" position.

2.1.3.1 Controller Options/Function Switch Settings

The Advantage, E9000 and *PowerPro* System option/function switches allow the user to set several operating parameters. All switch settings are initially set to "OFF" when shipped from the factory and function as follows in this position:

E9000 and Advantage Controller Top DIP Switch Settings

Switch 1:	Selects "Day-to-Day" Memory. Factory set to Memory off (See page 39).
Switch 2:	Selects the footswitch mode of operation - Variable Speed or ON/OFF mode. Factory set to Variable Speed mode (See page 40).
Switch 3:	Selects whether Audio is on or off. Factory set to off (See page 40).
Switch 4:	Selects the Handpiece Oscillation setting, Single or Multi-turn oscillation mode. Factory set to Single-turn oscillate mode (See page 43). When using an Advantage Turbo Handpiece (D9920/D9924) this switch selects the Handpiece Oscillation setting, Fixed Multi-turn or Adjustable Multi-turn oscillation mode. In Fixed Multi-turn, oscillations are set to 5 turns. In Adjustable Multi-turn, oscillations can be adjusted by the user between 1 and 10. Factory set to Fixed Multi-turn oscillate (5 turns) mode (See page 43).
Switch 5:	Selects Window Indexing. Factory set to Window Indexing off (See page 44).
Switch 6:	Selects the default speed of the Advantage D9820, D9920, D9824, and D9924 Shavers when using a high speed bur. With this switch set to "ON" default speed is the maximum handpiece speed With this switch set to "OFF" default speed is 7K rpm. Factory set to off, handpiece default speed at 7K rpm (See page 45).
Switch 7:	Selects whether the shaver handpiece buttons are enabled or disabled. Factory set to off, buttons enabled (See page 46).
Switch 8:	No application.

PowerPro and Advantage Controller Bottom DIP Switch Settings

Switch 1: Selects "Day-to-Day" Memory. Factory set to Memory off (See page 39).

Switch 2: Advantage Controller - No application.
PowerPro Controller - Selects the Footswich Mode of operation - Variable Speed or ON/OFF mode. Factory set to Variable Speed Mode (See page 40).

Switch 3: Selects the Handpiece operating Mode - Default or Swiss mode (*PowerPro* Electric Two-Trigger Handpiece only). Factory set to Default Mode (See page 41).

Switch 4: Selects the Handpiece Oscillation setting, Single or Multi-turn oscillation mode. Factory set to Single-turn oscillate mode (See page 42).

When using an Advantage Turbo Handpiece (D9920/D9924) this switch selects the Handpiece Oscillation setting, Fixed Multi-turn or Adjustable Multi-turn oscillation mode. In Fixed Multi-turn, oscillations are set to 5 turns. In Adjustable Multi-turn, oscillations can be adjusted by the user between 1 and 10.

Factory set to Fixed Multi-turn oscillate (5 turns) mode (See page 43).

Switch 5: Selects the Display Mode - Text (English) or Graphical mode. Factory set to Text Mode (See page 45).

Switch 6: Changes the operational functionality of the *PowerPro* Electric Two-Trigger Handpiece (PRO2200E) to operate like the *PowerPro* Battery PRO5200 or PRO5250 Handpieces. Factory set to operate like the *PowerPro* Electric Two-Trigger PRO2200E Handpiece (See page 46).

Switch 7: Selects the default speed of the Advantage D9820, D9920, D9824, and D9924 Shavers when using a high speed bur. With this switch set to "ON" default speed is the maximum handpiece speed. With this switch set to "OFF" default speed is 7K rpm. Factory set to off, handpiece default speed at 7K rpm (See page 45).

Switch 8: No application.

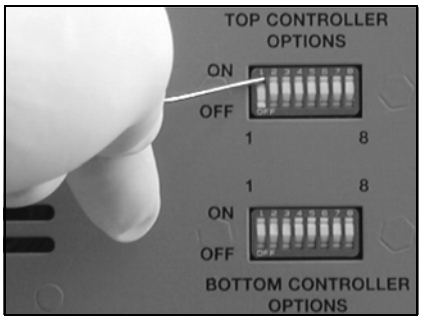
2.1.3.2 Switch 1 - "Day-to-Day" Memory Storage Operation

NOTE: This switch applies to the E9000 and *PowerPro* controller and to all ports of the Advantage controller.

The Advantage, E9000 and *PowerPro* controllers have the capability of "Day-to-Day" memory storage. "Day-to-Day" memory storage retains handpiece settings between controller uses (even if the controller power is turned off) and is only available when "CONTROLLER OPTIONS/FUNCTION" switch number 1 is set to the "ON" position.

Selection of "Day-to-Day" memory bypasses the controller start-up (default) settings. "Day-to-Day" memory can be achieved at any time by following steps 1 through 3 below.

1. Ensure controller power is off.
2. Place switch 1 on the E9000 and *PowerPro* controller, or the top and/or bottom of the Advantage controller to the "ON" position, depending upon which part of the Advantage controller will be used (Advantage controller shown).



3. Turn the controller on and utilize the system.

The last handpiece setting (including irrigation flow rate, top portion only on the Advantage controller) will be the initial setting when the controller is turned on again. If no change(s) was made, the initial or default setting for that handpiece(s) will be retained.

NOTE: If switch 1 is moved to "OFF" while the controller is on, the initial handpiece settings revert to the default settings when the controller power is turned off and then on again. See page 112 for handpiece default settings.

4. To turn "Day-to-Day" memory off, place switch 1 on the E9000 and *PowerPro* controller, or the top and/or bottom of the Advantage controller to the "OFF" position, depending upon which part of the controller will be used.

2.1.3.3 Switch 2 - Footswitch Mode Selection

NOTES:

1. **This switch applies to the E9000 and *PowerPro* controller and to the top portion only (Port 1 and Port 2) of the Advantage controller since there is no footswitch associated with the bottom portion of the Advantage controller. Switch 2 in the bottom row of switches is inactive.**

2. **See Switch 5 - Window Indexing on page 44 for footswitch operation exceptions.**

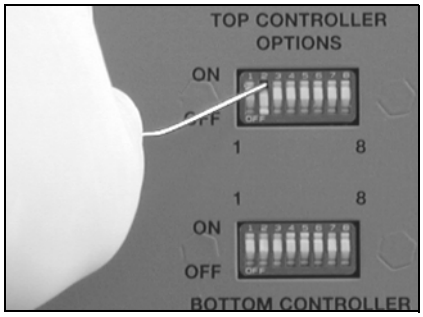
The position of this particular switch determines the operating mode of the footswitch, either Variable Speed mode or ON/OFF mode.

1. When the footswitch operates in Variable Speed mode, depressing the appropriate pedal for the handpiece in use varies the speed proportionally to the amount of pressure applied, up to the maximum speed setting.

   (a) To set the controller for the footswitch to operate in Variable Speed mode, place switch 2 to the "OFF" position.

2. When the footswitch operates in ON/OFF mode, depressing the appropriate pedal for the handpiece in use rotates the blade at the set speed, regardless of the amount of pressure applied. Therefore, when the appropriate pedal is depressed, the handpiece is on; when released, the handpiece is off.

   (a) To set the controller for the footswitch to operate in the ON/OFF mode, place switch 2 to the "ON" position.



2.1.3.4 Switch 3 - Audio Selection

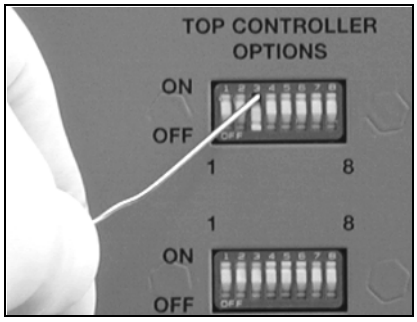
NOTES:

1. **This switch applies to the E9000 controller and the top portion only (Port 1 and Port 2) of the Advantage controller.**
2. **The audio selection is inoperative when using a *MicroChoice* saw (Reciprocating - 5020-023, Sagittal - 5020-022, or Oscillating - 5020-024) or the Cranial Perforator Drive Handpiece (E9015).**

The Audio Selection allows the user to turn the audio on or off.

When audio is on, forward, reverse and oscillate are pronounced when the handpiece direction is changed with the footswitch [See **"2.1.7 Footswitch Operation (Advantage Top Portion Only, PowerPro and E9000)" on page 55**], a 2-Button handpiece (C9824 or D9824), or a Full-Function handpiece (MC9828 or C9828).

1. To set audio on, place switch 3 to the "ON" position.



2. To set audio off, place switch 3 to the "OFF" position.

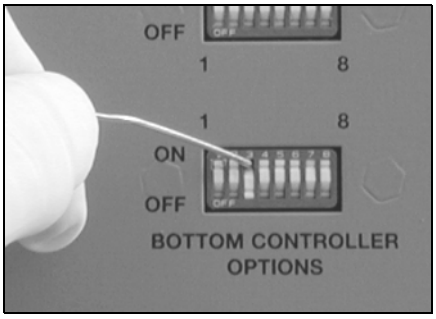
2.1.3.5 Switch 3 - Handpiece Operating Mode Selection (*PowerPro* Electric Two-Trigger Handpiece Only)

NOTES:

1. **This switch applies to the *PowerPro* controller and Port 3 of the Advantage controller.**
2. **The controller is shipped from the factory set to Default mode.**

The Handpiece Operating Mode Selection lets the user switch the functionality of the *PowerPro* Electric Two-Trigger Handpiece (PRO2200E) between the Default and Swiss mode of operation (Reference the associated *PowerPro* handpiece instruction manual on handpiece operation).

1. To set the controller to operate the *PowerPro* Two-Trigger handpiece in the Default Mode of operation, place switch 3 of the *PowerPro* controller or bottom row of the Advantage controller to the "OFF" position.
2. To set the controller to operate the *PowerPro* Two-Trigger handpiece in the Swiss Mode of operation, place switch 3 of the *PowerPro* controller or bottom row of the Advantage controller to the "ON" position.



2.1.3.6 Switch 4 - Oscillate Mode Selection (Shaver Handpieces Only)

NOTES:

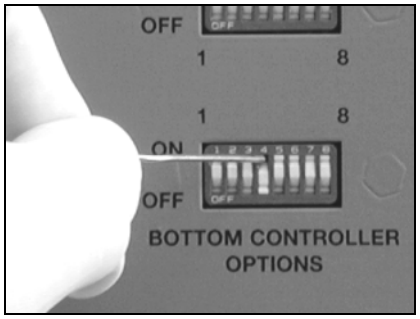
1. **This switch applies to the E9000 and *PowerPro* controller and to all ports of the Advantage controller.**
2. **This description of the functionality of this switch does not apply to the Advantage Turbo Handpieces, D9920 and D9924. See "2.1.3.7 Switch 4 - Oscillate Mode Selection (Turbo Shaver Handpieces Only - D9920 and D9924)" on page 43.**

The position of this switch determines the mode of operation, either single- or multi-turn oscillate mode, of the *MicroChoice* Shaver Handpieces, APEX Shaver Handpieces, E9005 High Speed Shaver, and the Advantage Shaver Handpieces (D9820 and D9824).

When using the 2-Pedal Footswitch (5020-053), the oscillation mode must first be selected using the left footswitch pedal [Reference **"2.1.7 Footswitch Operation (Advantage Top Portion Only, PowerPro and E9000)" on page 55**]. If using the Full-Function Shaver Handpieces (MC9828 and C9828), the APEX 2-Button Handpiece (C9824), or the Advantage 2-Button Shaver Handpiece (D9824), selection can also be made by pressing the handpiece direction select button.

1. When the controller is set to operate in single-turn oscillate mode, depressing the right pedal on the 2-Pedal Footswitch (5020-053) or the center pedal on the 3-Pedal Footswitch (C9863) causes the blade to rotate approximately one revolution in one direction, then in the opposite direction.
2. To set the controller to single-turn oscillate mode, place switch 4 to the "OFF" position.
3. When the controller is set to operate in multi-turn oscillate mode, depressing the right pedal on the 2-Pedal Footswitch (5020-053) or the center pedal on the 3-Pedal Footswitch (C9863) causes the blade to rotate several times in one direction, then several times in the opposite direction.

   (a) To set the controller to multi-turn oscillate mode, place switch 4 to the "ON" position.



2.1.3.7 Switch 4 - Oscillate Mode Selection (Turbo Shaver Handpieces Only - D9920 and D9924)

NOTE: This description of the functionality of this switch applies only to the Advantage Turbo Handpieces, D9920 and D9924.

The position of this switch determines the mode of operation, either fixed (5 turns) - or adjustable (between 1 - 10 turns) multi-turn oscillate mode, of the Advantage Turbo Shaver Handpieces (D9920 and D9924).

1. To set the controller to fixed multi-turn oscillate mode, place switch 4 to the "OFF" position.
2. To set the controller to adjustable multi-turn oscillate mode:, place switch 4 to the "ON" position.
3. To adjust the number of turns;
   (a) If a Turbo handpiece is connected, remove it.
   (b) Turn the console power off and connect an MC5057 Universal Handpiece Cable.
   (c) Press and hold the cable button while turning the console power back on. When the console displays "Cal. Requested" release the cable button.
   (d) When prompted by the console, enter the code 1 - 1 - 1. To enter a 1, press and release the cable button once for each digit of one.
   (e) When completed, the console will display "Oscillate 1 Turn" and the number 1 will be flashing.
   (f) Change the number of turns by pressing and releasing the cable button until the desired number of turns, between 1 and 10, is obtained.
   (g) To exit the menu, take no action (do not press the cable button). The console will time-out and return to the normal display.
   (h) Remove the MC5057 Universal Handpiece Cable and reconnect the Turbo handpiece.
4. If using the Advantage 2-Button Turbo Shaver Handpiece (D9924), oscillation mode can be selected by pressing the handpiece direction select button.
5. If using the Advantage Basic Turbo Shaver Handpiece (D9920), a footswitch must be used to access the oscillation mode and to operate the handpiece.
6. To operate a Turbo handpiece while using a 2-Pedal Footswitch (5020-053), select the oscillation mode by pressing the left footswitch pedal [Reference **"2.1.7 Footswitch Operation (Advantage Top Portion Only, PowerPro and E9000)" on page 55**]. Then depress the right pedal to activate the handpiece.

7. If using a 3-Pedal Footswitch (C9863), press the center pedal.
8. If it is desired to adjust the number of turns again, you must repeat steps 3(a) through 3(h).

2.1.3.8 Switch 5 - Window Indexing

NOTES:

1. **This switch applies to the E9000 controller and the top portion only of the Advantage controller.**

2. **Window Indexing applies only to all Group 3 handpieces and the E9005 High Speed Shaver.**

When "Window Indexing" is enabled with DIP Switch 5 on the E9000 controller or the top section of the Advantage controller, the appropriate footswitch pedal, or handpiece "ON/OFF" button is used to "index" or position the blade cutting window so that it stops in the same position each time the blade stops, i.e., where it starts is where it stops.

Window Indexing does not apply with burs.

1. To enable Window Indexing, place switch 5 of the E9000 controller or the top portion only of the Advantage controller to the "ON" position.

NOTE: When Window Indexing is enabled (DIP switch 5 set to "ON") the footswitch only operates in the ON/OFF mode with the MC9840, C9840 and E9005 handpieces. When using the MC9820, MC9828, C9820, C9824, C9828 and D9820, D9824 handpieces, this applies to shaver blades only. All other handpieces will operate as selected by DIP switch 2.

2. To set Window Indexing with the handpiece:

   (a) Press and hold the "On/Off" button. A single beep will sound and the blade will rotate slowly. When the cutting window is located at the desired position, release the button.

   (b) Press and release the "On/Off" button rapidly, the handpiece will run at the set speed and stop at the set location.

3. To set Window Indexing with the footswitch:

NOTE: Using the two pedal footswitch (5020-053), Window Indexing can only be achieved using the right pedal. Using the three pedal footswitch (C9863), Window Indexing can be set with either the left or right pedal, but not the center pedal.

   (a) Press the pedal slowly until you hear a single beep, then maintain pedal position. The blade will rotate slowly. When the cutting window is located at the desired position, release the pedal.

NOTE: Once the blade starts to rotate you can fully depress the pedal if desired.

   (b) Press the pedal rapidly. The handpiece will run at the set speed and stop at the set location.

4. To disable Window Indexing, place switch 5 of the E9000 controller or the top portion only of the Advantage controller to the "OFF" position.

2.1.3.9 Switch 5 - Display Mode Selection

NOTE: This switch applies only to the *PowerPro* controller and the bottom row of the Advantage controller.

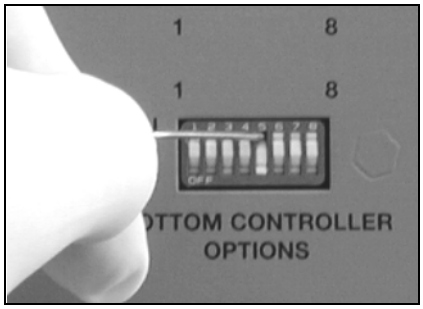
The position of this switch determines how information is displayed on the controller, either text or symbols.

1. When the controller is set to display information in text mode, all information is displayed in English text.

   (a) To set the controller to Text mode, place switch 5 (*PowerPro* controller or bottom portion only of the Advantage controller) to the "OFF" position.

2. When the controller is set to display information in Graphics mode, all information is displayed with symbols.

   (a) To set the controller to Graphics mode, place switch 5 (*PowerPro* controller or bottom portion only of the Advantage controller) to the "ON" position.



2.1.3.10 Switch 6 / Switch 7 - Shaver Default Speed Setting

NOTES:

1. **This description for switch 6 applies to the E9000 controller and the top portion of the Advantage controller.**
2. **This description for switch 7 applies to the bottom portion of the Advantage controller and the PRO2000 controller.**
3. **This option applies only to the Advantage Basic (D9820/D9920) and 2-Button (D9824/D9924) Shaver Handpieces.**

This switch is used to set the default operating speed of a high speed bur when used with these handpieces.

1. When DIP switch 6 on the E9000 controller or the top row of the Advantage controller, or DIP switch 7 on the bottom row of the Advantage controller are set to "ON" these handpieces will default to their maximum operating speed when a high speed bur is in use.
2. When DIP switch 6 on the E9000 controller or the top row of the Advantage controller, or DIP switch 7 on the bottom row of the Advantage controller are set to "OFF" these handpieces will default to 7,000 rpm operating speed when a high speed bur is in use.

2.1.3.11 Switch 6 (Bottom Row Only) - Special Handpiece Operating Mode Selection (*PowerPro* Two-Trigger Handpiece Only)

NOTES:

1. **This description for switch 6 applies to the *PowerPro* controller and the bottom portion only (Port 3) of the Advantage controller. It works in conjunction with switch 3.**
2. **To maintain the original electrical handpiece operation, place switch 6 of the *PowerPro* controller and the bottom portion only (Port 3) of the Advantage controller to the "OFF" position.**

This selection allows the user to switch the functionality of the *PowerPro* Electric Two-Trigger Handpiece (PRO2200E) to function like either the *PowerPro* PRO5200 or PRO5250 Battery Handpiece (Reference the associated *PowerPro* handpiece instruction manual on handpiece operation).

1. To set the controller to operate the *PowerPro* Two-Trigger Electric handpiece like the *PowerPro* PRO5200 Battery Handpiece, place switch 6 to the "ON position, and switch 3 to the "OFF" position of the *PowerPro* controller or bottom portion only of the Advantage controller.
2. To set the controller to operate the *PowerPro* Two-Trigger Electric handpiece like the *PowerPro* PRO5250 Battery Handpiece, place switch 6 to the "ON" position, and switch 3 to the "ON" position of the *PowerPro* controller or bottom portion only of the Advantage controller.

2.1.3.12 Switch 7 - Shaver Button Setting

NOTES:

1. **The description for this switch applies to the E9000 controller and the top portion only of the Advantage controller.**
2. **This option applies only to the MC9828, C9824, C9828, D9824, and D9924 handpieces.**

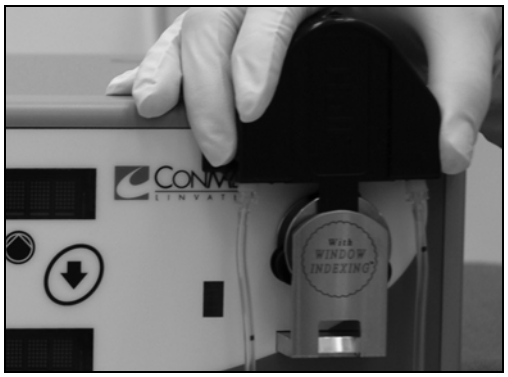
This switch is used to enable or disable all handpiece buttons.

1. To enable the buttons on these handpieces, place switch 7 to the "OFF" position.
2. To disable the buttons on these handpieces, place switch 7 to the "ON" position.

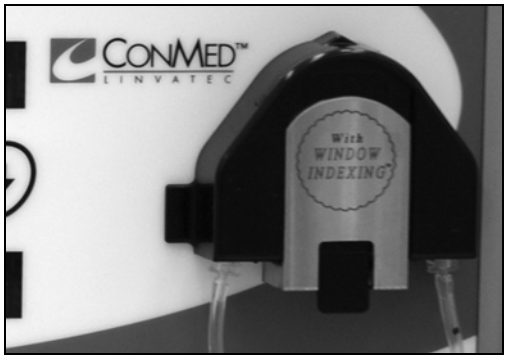
2.1.4 Tubing Set Cassette Installation

If using irrigation (recommended when using the CoolFlex High Speed Drill) use surgical aseptic techniques to attach the tubing set as follows (Advantage controller shown):

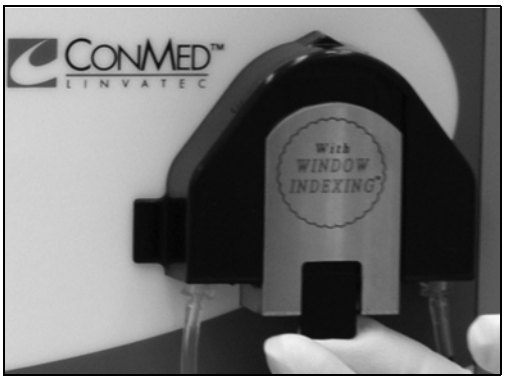
1. **Circulator -** Open the tubing package. Present the package contents to the Scrub.
2. **Scrub -** Remove the tubing set from its sterile package and pass the black cassette and bag spike line out of the sterile field to the Circulator.
3. **Circulator -** Position the cassette over the pump rotor on the controller with the tubing facing down and the black tab behind the metal plate.



4. Slide the cassette down until it snaps into place.



5. Remove the cap from the bag spike and pierce the sterile fluid bag connector.
6. To remove the cassette, pull out on the black tab at the bottom of the cassette.



7. After use, dispose of tubing set properly.

2.1.5 Controller Operation

After all the desired settings have been made to the "CONTROLLER OPTIONS/FUNCTION" switches, and the tubing set is attached, if using irrigation, turn on the controller.

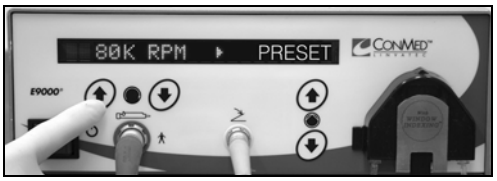
1. Depress the standby power switch on the front of the controller to the ON position to activate the controller.

- A self-diagnostic test will be performed and the display will indicate **"Prog Mem Test"**.
- When the test is concluded, the controller will sense the attached handpiece and display, either in text form or graphical form, the operating mode, operating speed and/or direction setting, depending upon the handpiece that is attached and which portion of the controller the handpiece is attached to.

Without any user input selections, handpieces will initially operate at their default setting. Desired speed and irrigation settings can be stored in memory by following the instructions in **"2.1.3.2 Switch 1 - "Day-to-Day" Memory Storage Operation" on page 39**.

2. To adjust the handpiece speed using the controller buttons (Advantage Top Portion Only and E9000):

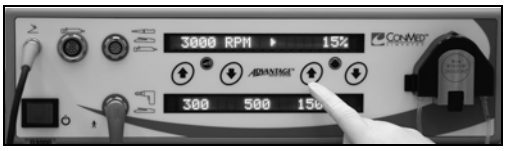
   (a) Press the speed increase or decrease button on the front panel.



3. To adjust speed settings with the handpiece cord button, where applicable, reference **"3.6.5 Group 2 Handpiece Cord Button Operation" on page 93** or **"3.9.2.4 Using the Handpiece Cord Button to Change Speed" on page 100**.

4. To adjust the irrigation flow rate (Advantage Top Portion Only and E9000):

   (a) Press the flow increase or decrease button on the front panel.



NOTE: If using the E9414 Tubing Set with the CoolFlex Drill, the flow rate cannot be changed. The display will show "PRESET" for the flow rate.

2.1.6 *PowerPro* Console Irrigation

This information describes the installation and utilization of the Hall Irrigation Pump (5040-039, 110 VAC or 5040-239, 220 VAC) with the *PowerPro* controller. This irrigation pump is no longer sold.

2.1.6.1 Irrigation Pump Installation

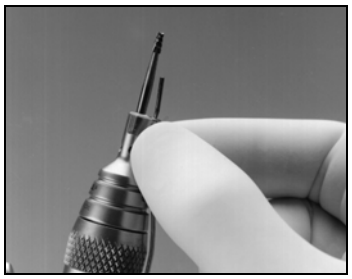
NOTE: The Irrigation Pump only operates with *MicroChoice* drills and saws and the MC9840 or C9840 Small Shaver Handpieces.

PRECAUTION: The Hall Irrigation Pump (5040-039 or 5040-239) should be utilized if irrigation is required when using the *MicroChoice* Drills or Saws, or the MC9840 or C9840 Small Shaver Handpieces. For additional information regarding Irrigation set-up, refer to the *Hall* *Irrigation System Instruction Manual* or contact Hall Surgical.

1. Place the Irrigation Pump on top of the controller in the defined footrest area.
2. Plug the power cord into the back of the Irrigation Pump and a standard, grounded wall outlet.

3. Insert the Irrigation Cord connector into the "ELECTRIC INPUT" receptacle on the front of the Irrigation Pump.

4. Insert the other end of the Irrigation Cord connector into the "IRRIGATION" receptacle on the back of the *PowerPro* controller.
5. Attach the irrigation hanger and solution bag to the pump.
6. Fully assemble the Irrigation Tubing to the Irrigation Pump.
7. Attach the proper Irrigation Tips and Tubing to the handpiece. For additional information refer to the *Hall Irrigation System Instruction Manual*.

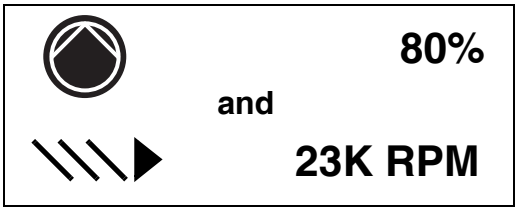


2.1.6.2 Irrigation Pump Operation

NOTE: Flow rate default setting for all handpieces and attachment options is 100%.

1. Turn the pump on. Rotate the "FLOW" control dial to the maximum flow rate (4).

The controller will alternately display the handpiece in use along with its operating speed, with **"IRRIGATION"** and the current irrigation flow rate **"###%"**. Depending upon the Display mode, either Text or Graphical, this information will be displayed with text or symbology, as shown on pages 51 or 52.

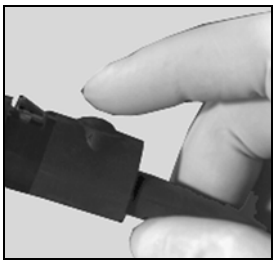


NOTES:

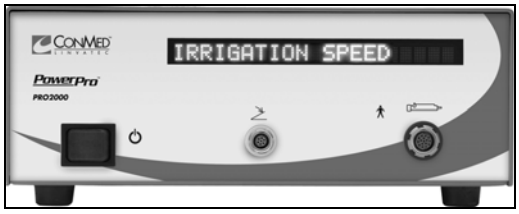
1. **For an example, see the text and symbology flow charts on page 53.**
2. **Step 2 does not apply to any of the APEX Shaver Handpieces.**

2. To change either the irrigation flow rate or the handpiece speed, perform the following.

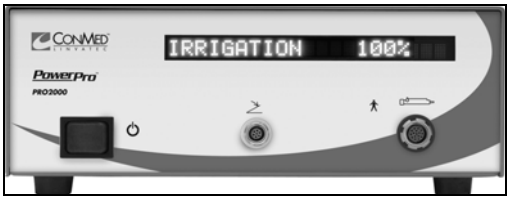
   (a) Press the handpiece cord button twice to enter the options menu.



   (b) "**IRRIGATION"** and **"SPEED"** will display with "**IRRIGATION"** blinking.



(c) If the irrigation flow rate is to be changed, no action is needed. The menu will default to the irrigation flow rate menu. The word **"IRRIGATION"** will be displayed along with "**###%**" ("**###**" will be blinking). If only the handpiece speed is to be changed and not the irrigation flow rate, proceed to step 2 (g).



(d) Press the handpiece cord button until the desired flow rate displays. Stop pressing. Next, the attached handpiece I.D. and current operating speed will display (the speed will be blinking).

(e) To change the operating speed, press the handpiece cord button until the desired speed is obtained. Stop pressing.

(f) The controller is now ready to operate at the current settings. Go to step 3.

(g) If only the handpiece speed is to be changed without a change to the irrigation flow rate, depress the handpiece cord button until the word **"SPEED"** is blinking. The menu will default to the handpiece speed menu. The attached handpiece I.D. and current operating speed will display (the speed will be blinking).

(h) To change the operating speed, press the handpiece cord button until the desired speed is obtained. Stop pressing.

3. To activate the handpiece and Pump simultaneously, depress the appropriate activation device (Activation Lever or footswitch pedal).

Irrigation Flow Rate and Handpiece Speed Adjustment
(Does not apply to any APEX Shaver Handpiece)

To enter the menu options and adjust both the irrigation flow rate and handpiece speed, press the handpiece cord button two or three times.

Text Display Mode	Graphics Display Mode
"IRRIGATION" **"SPEED"**	
"IRRIGATION" is blinking	
No action taken	
"IRRIGATION" **"###%"**	
"###" is blinking	
Press the handpiece cord button until the desired flow rate is displayed. Stop pressing the button. After a few seconds, the menu will default to the speed menu, displaying the attached handpiece and the current speed setting.	
"HIGH SPEED" **"###K RPM"**	
"###" is blinking	
Press the handpiece cord button until the desired speed is displayed. Stop pressing the button.	

Handpiece Speed Adjustment Only
(Does not apply to any APEX Shaver Handpiece)

To enter the menu options and adjust only the handpiece speed, press the handpiece cord button two or three times.

Text Display Mode

"IRRIGATION" **"SPEED"**

"IRRIGATION" is blinking

Press the handpiece cord button until **"SPEED"** is blinking.

The menu will default to the speed menu and display the attached handpiece and the current speed setting.

"HIGH SPEED" **"###K RPM"**

"###" is blinking

Press the handpiece cord button until the desired speed is displayed. Stop pressing the button.

Graphics Display Mode

2.1.7 Footswitch Operation (Advantage Top Portion Only, *PowerPro* and E9000)

Warning: To avoid unintentional handpiece activation, unplug the footswitch when using a levered handpiece, or a 2-Button or Full-Function Shaver Handpiece. When the footswitch is attached to the controller it will remain active.

NOTES:

1. **Either footswitch, 2-Pedal or 3-Pedal, will control handpieces being operated with the E9000 controller, *PowerPro* controller, or in Port 1 or Port 2 only on the top portion of the Advantage controller.**
2. **The handpiece and footswitch operate on a first come, first served basis. If the handpiece is activated with the footswitch, the handpiece activation lever or button is inoperative until the footswitch pedal is released, and vice versa.**
3. ***PowerPro* Handpieces, the *MicroChoice* Modular Handpiece and the Mini-Driver Handpiece will not operate with the footswitch.**

When a handpiece is attached to the controller the firmware senses the type of handpiece connected and programs the footswitch to operate accordingly.

1. Either footswitch (5020-053 or C9863) will operate in one of two modes, either Variable Speed mode or ON/OFF mode, when used with any handpiece except *PowerPro* Handpieces, the Mini-Driver Handpiece (K500) and the *MicroChoice* Modular Handpiece (5020-027). For information regarding setting the Footswitch Mode Selection, see **“2.1.3.3 Switch 2 - Footswitch Mode Selection” on page 40**.

   (a) When operating in Variable Speed mode, the speed varies within predetermined limits by the amount of pressure applied to the appropriate pedal. The blade speed min/max range is determined by the shaver handpiece and cutter blade in use (Reference **“2.1.5 Controller Operation” on page 48** or **“3.6.5 Group 2 Handpiece Cord Button Operation” on page 93** or **“3.9.2.4 Using the Handpiece Cord Button to Change Speed” on page 100** for information to change operating speeds).

(b) When operating in ON/OFF mode, the handpiece motor is either ON (pedal depressed) or OFF (pedal released). The motor rotates at a fixed rate regardless of the amount of pressure applied to the pedal (Reference **"2.1.5 Controller Operation" on page 48**, **"3.6.5 Group 2 Handpiece Cord Button Operation" on page 93** or **"3.9.2.4 Using the Handpiece Cord Button to Change Speed" on page 100** for information to change operating speeds).

2.1.7.1 Operation of the 2-Pedal Footswitch (5020-053)

Operation of the footswitch when using a *MicroChoice* Sagittal Saw (5020-022), Reciprocating Saw (5020-023), Oscillator Handpiece (5020-024), or E9015 Cranial Perforator Drive:

1. Depress either the left or right pedal to activate the handpiece.

NOTE: There is no oscillate or reverse mode for these handpieces.

Operation of the footswitch when using a *MicroChoice* Elite High Speed Drill (5020-025), Medium Speed Drill (5020-021), or Low Speed Drill (5020-026) and the CoolFlex High Speed Drill (E9010):

1. Depress the right pedal to activate the handpiece in the forward direction.

2. Depress the left pedal to activate the handpiece in the reverse direction. A brief audible beeping tone will indicate reverse direction when the handpiece is initially activated.

Operation of the footswitch when using the following handpieces (C9820, MC9820, C9824, C9828, MC9828, C9840, MC9840, E9005, D9820, D9824, D9920, and D9924):

1. Set the desired direction (forward, reverse or oscillate) by pressing the left footswitch pedal. The display will indicate the direction change and a beep will sound every time the pedal is pressed.

2. To operate the handpiece, depress the right footswitch pedal. The operating speed and direction arrow will display on the controller.

3. If irrigation is being utilized, fluid flow will begin when the right pedal is depressed.

Window Indexing:

When "Window Indexing" is enabled with DIP Switch 5 on the E9000 controller or the top section only of the Advantage console (see **"2.1.3.8 Switch 5 - Window Indexing" on page 44**) the footswitch right pedal is used to "index" or position the blade cutting window so that it stops in the same position each time the blade stops, i.e., where it starts is where it stops.

NOTE: Window Indexing applies only to all Group 3 handpieces and the E9005 High Speed Shaver. When Window Indexing is enabled the footswitch only operates in the ON/OFF mode with the MC9840, C9840 and E9005 handpieces. Variability is not available. When using the MC9820, MC9828, C9820, C9824, C9828, D9820, D9824, D9920, and D9924 handpieces, this applies to shaver blades only. All other handpieces will operate as selected by DIP switch 2.

1. To set Window Indexing:

   (a) Press the right pedal slowly until you hear a single beep, then maintain pedal position. The blade will rotate slowly. When the cutting window is located at the desired position, release the pedal.

NOTE: Once the blade starts to rotate you can fully depress the pedal if desired.

   (b) Press the pedal rapidly. The handpiece will run at the set speed and stop at the set location.

2.1.7.2 Operation of the 3-Pedal Footswitch (C9863)

Operation of the footswitch when using a *MicroChoice* Sagittal Saw (5020-022), Reciprocating Saw (5020-023), Oscillator Handpiece (5020-024), or E9015 Cranial Perforator Drive:

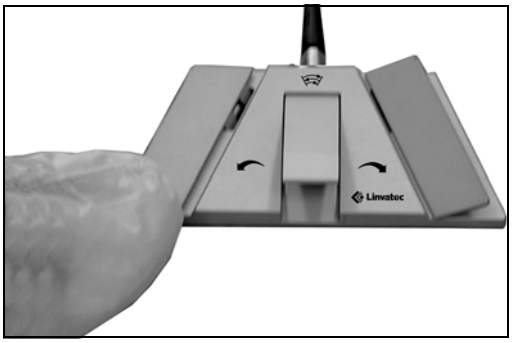
NOTE: There is no oscillate or reverse mode for these handpieces.

1. Depress either the left or right pedal to activate the handpiece.
2. The center pedal is inoperative using these handpieces.

Operation of the footswitch when using a *MicroChoice* Elite High Speed Drill (5020-025), Medium Speed Drill (5020-021), or Low Speed Drill (5020-026) and the CoolFlex High Speed Drill (E9010):

1. Depress the right pedal to activate the handpiece in the forward direction.

2. Depress the left pedal to activate the handpiece in the reverse direction. A brief beep will indicate reverse direction when the handpiece is initially activated.

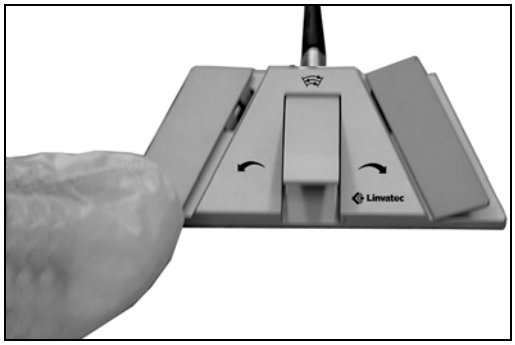


3. The center pedal is inoperative using these handpieces.

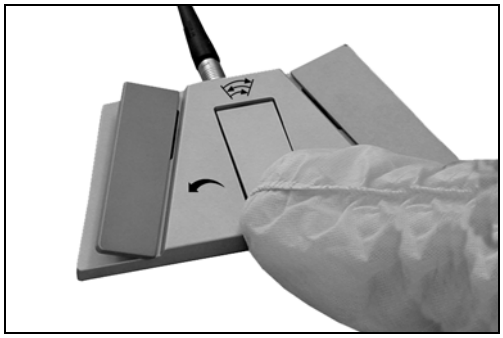
Operation of the footswitch when using the following handpieces (C9820, MC9820, C9824, C9828, MC9828, C9840, MC9840, E9005, D9820, D9824, D9920, and D9924):

1. Depress the right pedal to activate the handpiece in the forward direction.

2. Depress the left pedal to activate the handpiece in the reverse direction. A brief beep will indicate reverse direction when the handpiece is initially activated.



3. Depress the center pedal to activate the handpiece in oscillate mode. There is no variable speed with the center pedal, only on or off.



4. If irrigation is being utilized, fluid flow will begin when either the left or right pedal is depressed.

Window Indexing:

When “Window Indexing” is enabled with DIP Switch 5 on the E9000 controller or the top section only of the Advantage console (see **“2.1.3.8 Switch 5 - Window Indexing” on page 44**) the footswitch right or left pedals are used to “index” or position the blade cutting so that it stops in the same position each time the blade stops, i.e., where it starts is where it stops.

1. To set Window Indexing:

   (a) Press the right or left pedal slowly until a single beep is heard, then maintain pedal position. The blade will rotate slowly. When the cutting window is at the desired position, release the pedal. Once the blade starts to rotate you can fully depress the pedal, if desired.

(b) Press the pedal rapidly. The handpiece will run at the set speed and stop at the set location.

NOTES:

1. **Window Indexing cannot be set with the center pedal.**
2. **When Window Indexing is enabled the footswitch only operates in the ON/OFF mode. Variability is not available.**

3.0 HANDPIECE OPERATION

PRECAUTION: When operating shaver blades or burs in any Group 3 handpiece (reference "3.9 Group 3 Handpiece Operation" on page 98) the shaver handpiece suction port valve must be in the open or ON position, and the shaver blade or bur must be within the distention fluid of the joint. Otherwise, damage to the blade hub or bur hub will result.

Warning: When not in use and prior to connecting or removing attachments and accessories, always place the handpiece in its safe, or off position, if applicable.

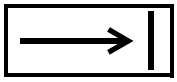
NOTES:

1. **If a levered handpiece (5020-021, -022, -023, -024, -025) is placed on a magnetic drape, the controller may display "MAGNETIC FIELD". The handpiece will be inoperable until the magnet and handpiece are separated. Once separated, the controller will reset after three (3) seconds.**

   If a levered handpiece is being used on the *PowerPro* controller or in Port 3 of the Advantage controller, and switch 5 is set to Graphical Display mode, the controller will display:

2. **Operation of a drill (5020-021, -025, -026, CoolFlex) without a bur locked in place is considered a failure mode. If the handpiece is activated for several seconds without a bur in place, the controller will display "STALL, CHECK BUR LOCK". Operation cannot be initiated until a bur is locked in place and at least five (5) seconds have elapsed without the footswitch or handpiece activation lever (5020-021, -025, -026 only) being depressed.**

   If the handpiece is being used on the *PowerPro* controller or in Port 3 of the Advantage controller, (excludes the CoolFlex Drill), and switch 5 is set to Graphical Display mode, the controller will display:



3. **If the "STALL, CHECK BUR LOCK" message displays upon initial activation of the CoolFlex Drill while a bur is locked in place, this may indicate that the drill was not cleaned correctly and the bearings are locked due to debris build-up. To correct the problem, perform the following:**

   (a) Disconnect the handpiece from the controller.

   (b) Rotate the bur in the handpiece with your fingers until the bur spins freely.

   (c) If the message still displays when the handpiece is activated with the footswitch, return the handpiece and bur guard to ConMed Linvatec for service.

4. **The handpiece cord may be disconnected from one handpiece and connected to another handpiece, if applicable, without turning off the controller.**

5. **Handpieces are inoperable if the activation lever or trigger is depressed while connecting the handpiece cord.**

6. **The *MicroChoice* Modular Handpiece (5020-027), Mini-Driver Handpiece (K500), or any of the *PowerPro* handpieces will not operate by the footswitch.**

Group 1 Handpieces

NOTES:

1. **Group 1 handpieces consist of the High Speed Shaver (E9005), CoolFlex Drill (E9010), and Cranial Perforator Drive (E9015).**

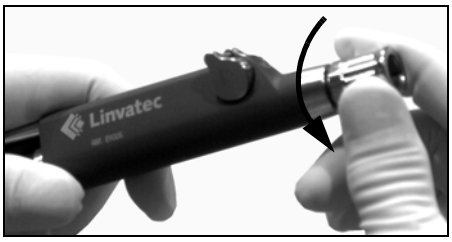
2. **Group 1 handpieces will operate on the E9000 controller and only in Port 2 (Top Portion) of the Advantage controller.**

3.1 High Speed Shaver (E9005) Operation

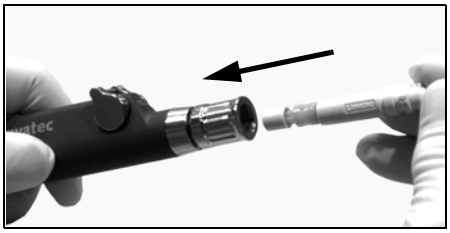
NOTE: If irrigation is being utilized, the E9416 (4.2 mm) or E9417 (3.7 mm) Tubing Set must be used.

1. To insert a shaver blade or bur:

   (a) Open the collet by turning the locking collet counterclockwise as viewed from the collet end of the handpiece.

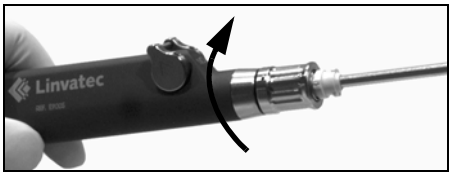


   (b) Insert a shaver blade or bur until the shaft is completely seated.



   (c) If using a shaver blade, rotate the shaver blade until the cutting window is in the desired position.

   (d) Secure the shaver blade or bur by turning the locking collet clockwise.

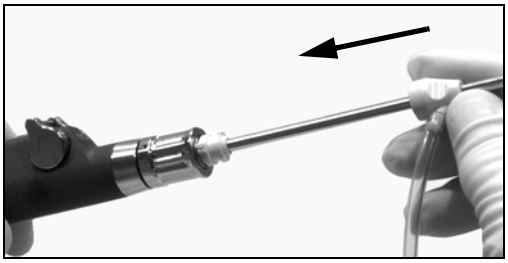


(e) Pull on the shaver blade or bur to ensure it is locked in place.

(f) To remove the shaver blade or bur, open the locking collet by turning it counterclockwise as viewed from the collet end of the handpiece. Pull the shaver blade or bur out.

2. If irrigation is being used, and the E9416 or E9417 Tubing Set is utilized:

(a) Attach the tubing to the shaver blade and handpiece by sliding the tubing set irrigation collar over the distal end of the shaver blade toward the shaver blade hub.

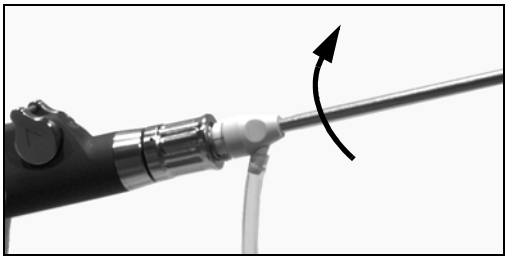


NOTE: Prior to bending the shaver blade, the irrigator collar must be installed. See blade insert sheet for blade bending information.

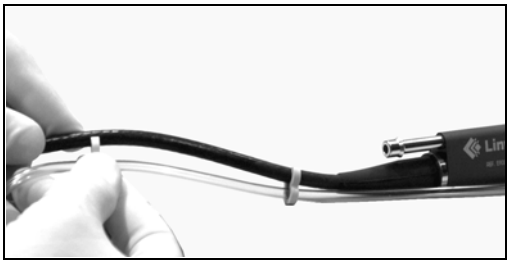
Warning: If operating the E9005 Shaver in the oscillate mode between 2500 and 5000 rpm, and with a shaver blade in the bent position, you MUST use either the E9416 or E9417 Irrigation Tubing Set and irrigation MUST be set to 100%.

(b) Slide the inner recesses of the collar completely over the two hub-ears on the shaver blade hub.

(c) Turn the irrigation collar clockwise (approximately 90°) and securely lock it into place.



(d) Snap the handpiece cord clips onto the handpiece cable to secure the tubing.



3. For best resection performance, completely open the handpiece suction port valve by positioning it towards the front of the handpiece.

3.2 CoolFlex High Speed Drill (E9010) Operation

PRECAUTIONS:

1. **Do not operate the handpiece with the collet open. Damage will occur.**
2. **Cooling for the handpiece body is recommended at all times. When using the E9414 Tubing Set, the tubing line MUST be fully primed or the handpiece will overheat, causing damage to the handpiece (see " E9414 Tubing Set with Recirculation only:" on page 69 for information on priming the tubing set).**
3. **When using the CoolFlex Drill to cut bone during a craniotomy procedure, let the bur do the cutting. Excessive pressure is not needed. Ensure the bur is perpendicular with the cutting surface. Do not angle the cutting tool or attempt to force or saw with the bur into the bone. Doing so may cause the handpiece to stall and the controller will display "STALL, CHECK BUR LOCK". To reactivate the handpiece, release the footswitch for a few seconds to reset the controller.**
4. **Ensure the bur is not in contact with the cutting surface before activating the drill. Doing so will not allow the drill to attain the speed required for efficient cutting.**
5. **Make sure tubing set is fully primed prior to use.**

Warning: Ensure the fluid bag is spiked, otherwise, damage or injury may result.

NOTES:

1. **Use only Ultrapower® Series 7021 burs, and Series E4xxx, E5xxx, E6xxx and E8xxx burs.**
2. **If using the E9414 Tubing Set (without irrigation) with the CoolFlex High Speed Drill, the flow rate cannot be changed. The display will show "PRESET" for the flow rate.**
3. **When using the E9415A Tubing Set with the CoolFlex High Speed Drill, the flow rate defaults to 50% and is adjustable between 40% and 100%. The flow rate cannot be shut off.**
4. **There is no oscillate mode for this handpiece.**

3.2.1 Preoperative Functional Test for the CoolFlex High Speed Drill

Prior to operating the CoolFlex High Speed Drill, perform the following preoperative checks to verify proper functioning. Any operating difficulties should be reported to your Sales Representative or ConMed Linvatec Customer Service.

Warning: Use of a drill not functioning properly can result in injury to the patient or medical personnel.

1. Before operation of the drill, check for:
   - any loose or missing parts
   - any physical damage
   - movable parts that do not move freely
2. Performance Testing:
   (a) Assemble the appropriate guard, accessory, and/or tubing set according to the instructions on pages 66 through 71. **Warning: Ensure that the guard and bur are properly installed, otherwise injury to the patient or medical personnel can result.**

   (b) Operate the drill at 60,000 rpm for 30 seconds in the straight position according to controller and footswitch operating instructions contained on pages 48 through 58 and monitor for any of the following:
      - excessive noise
      - excessive vibration
      - the drill or bur guard being hot to the touch during the test procedure or during surgical use
      - the drill not operating up to its maximum preset speed (verify the maximum preset operating speed by fully depressing the appropriate footswitch pedal. Verify that the maximum speed is displayed on the controller).

3.2.2 Bur Guard Attachment

1. To attach the bur guard:

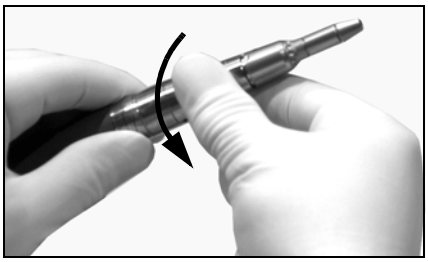
   (a) Align the etch mark on the guard with the etch mark on the handpiece guard collet.

   (b) Looking at the nose of the handpiece, hold the swivel sleeve and push the guard completely inward. Twist clockwise and release. The guard is now locked into place.

2. Select the proper bur for the guard being used.

3. To install the bur:

   (a) Rotate the keyless chuck counterclockwise until the collet screws are aligned with the "unlock" icon.



   (b) Completely insert the bur. The safety line on the bur shank, if marked, must be hidden by the guard.

Warning: Ensure the safe-line mark on the bur, where indicated, is not showing. Damage or injury may result.

   (c) Rotate the keyless chuck clockwise until the collet screws are aligned with the "lock" icon.

   (d) Pull on the bur to ensure it is locked in place.

4. To remove the bur:

   (a) Rotate the keyless chuck counterclockwise until the collet screws are aligned with the "unlock" icon.

   (b) Pull the bur out of the collet.

5. To remove the guard:

   (a) Push the guard inward. Twist the guard counterclockwise and remove.

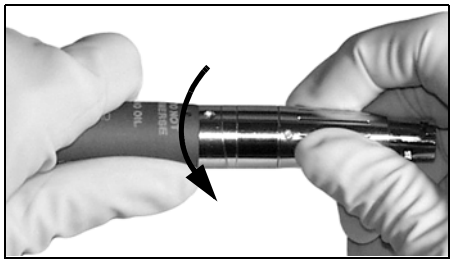
3.2.3 Neuro Guard Attachment

When using a neuro guard and bur, the bur is inserted before the guard.

1. To install the bur:

   (a) Select the proper bur for the guard being used.

   (b) Rotate the keyless chuck counterclockwise until the collet screws are aligned with the "unlock" icon.



   (c) Completely insert the bur.

   (d) Rotate the keyless chuck clockwise until the collet screws are aligned with the "lock" icon.

   (e) Pull on the bur to ensure it is locked in place.

2. To attach a neuro guard:

   (a) Select the appropriate guard for the bur being used.

   (b) Align the etch mark on the guard with the etch mark on the handpiece guard collet.

   (c) Looking at the nose of the handpiece, hold the swivel sleeve and push the guard completely inward. Twist clockwise and release. The guard is now locked into place.

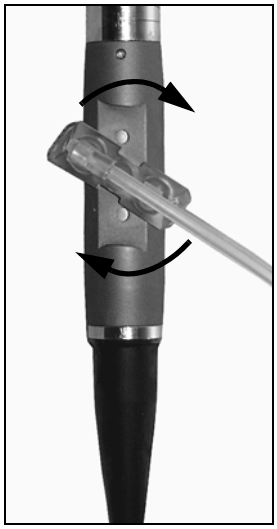
3. To remove the bur and guard, the guard must be removed first:

   (a) Remove the guard by pushing the guard inward, twisting the guard counterclockwise and removing it.

   (b) Remove the bur by rotating the keyless chuck counterclockwise until the collet screws are aligned with the "unlock" icon. Remove the bur.

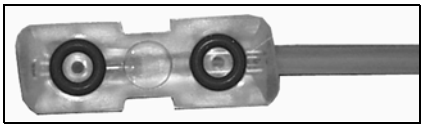
3.2.4 Tubing Set Line Attachment

1. If irrigation is being used, attach the black cassette of the tubing set to the controller (reference **"2.1.4 Tubing Set Cassette Installation" on page 47**).
2. Spike the fluid bag.
3. Prior to connecting the clear plastic handpiece cassette of the tubing set to the handpiece, lubricate the O-Rings with sterile fluid.
4. While holding the nose of the handpiece upward, place the plastic handpiece cassette onto the post within the cassette holder opening, perpendicular to the handpiece.



5. Twist the cassette clockwise until it is aligned with the handpiece body. No downward pressure is needed while turning.

6. If leakage occurs at this interface while operating the handpiece, perform the following to alleviate the leakage:
   (a) Remove the clear plastic cassette from the handpiece by reversing steps 4 and 5.
   (b) Inspect the O-Rings to ensure they are seated properly within the handpiece cassette.



   (c) If no problems exist, reinstall the clear plastic cassette in the handpiece by following steps 4 and 5.
   (d) If leakage still occurs, replace the tubing set.

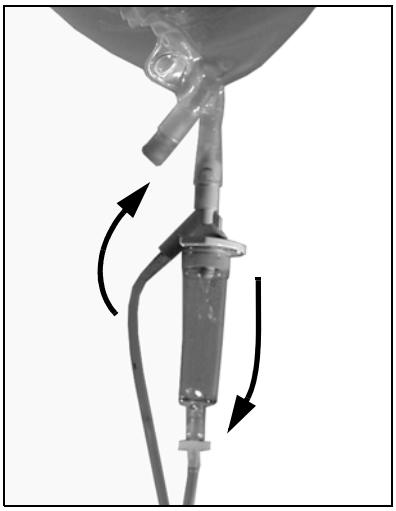
E9414 Tubing Set with Recirculation only:

PRECAUTION: When using the E9414 Tubing Set, the tubing line MUST be fully primed (no air in line) or the handpiece will overheat, which will cause damage to the handpiece.

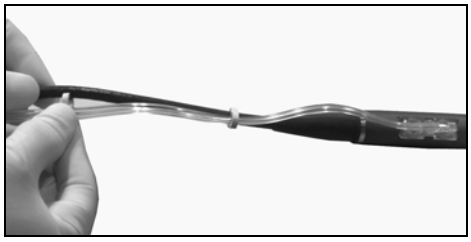
1. Prime the tubing by doing the following:

   (a) Squeeze the priming chamber.

   (b) While continuously squeezing the priming chamber, operate the drill at low speed until fluid completely fills the tubing and is recirculated back into the fluid bag. Ensure fluid remains in the priming chamber during use with no air in the tubing.



2. Snap the handpiece cord clips onto the handpiece cable to secure the tubing.



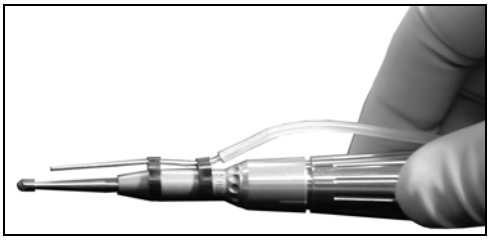
E9415A Tubing Set with Integrated Irrigation Tip:

NOTE: The integrated irrigation tip of this tubing set will attach to all the associated bur guards for the CoolFlex High Speed Drill.

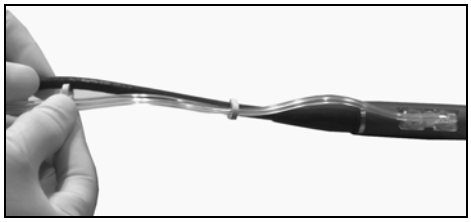
1. **SCRUB** - Peel the Discharge Line tubing, marked "TO WASTE CONTAINER" away from the rest of the tubing and pass to the Circulator.
2. **CIRCULATOR** - Attach this line to the discharge bucket using the attached waste container adapter.
3. **SCRUB** - Prior to attaching the irrigation tip to the bur guard, bend the irrigation tip to the desired position and lightly squeeze the black clips and slide them to the desired location.

NOTE: When using the medium bur guard (E9011-1) remove the distal clip from the tubing).

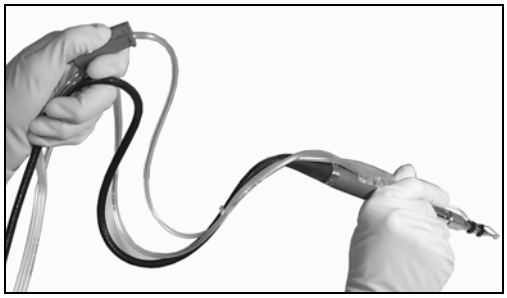
4. **SCRUB** - Snap the clips onto the bur guard. **Note: The rear clip has an integrated rib that will snap into the rear groove of the bur guard.**



5. **SCRUB** - Snap the handpiece cord clips onto the handpiece cable to secure the tubing.



6. **CIRCULATOR** - To adjust fluid flow to the operative site between 40% and 100%, use the controller Flow Increase or Decrease buttons.
7. **SCRUB** - To adjust fluid flow to the operative site below 40%, use the roller clamp.



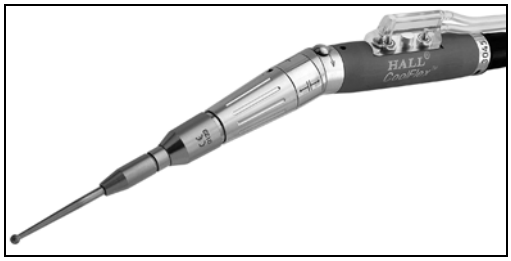
3.2.5 Handpiece Adjustment

The CoolFlex High Speed Drill can be adjusted to a 20° angle, without the use of a separate attachment, for access to hard to reach areas.

PRECAUTION: The handpiece should only be operated in the 0° or 20° position, not at any other angle. Damage to the handpiece will occur.

NOTE: Unless the angled position is needed, or when aggressive cutting is required, it is recommended that the CoolFlex High Speed Drill be operated in the straight position for optimal operation and cooling.

1. To adjust the angle of the handpiece:
   (a) Grasp the main handpiece body and the keyless chuck.
   (b) Press the collet locking button to unlock the chuck.
   (c) Twist the keyless chuck clockwise while twisting the main body in the opposite direction until the collet locking button clicks into place.



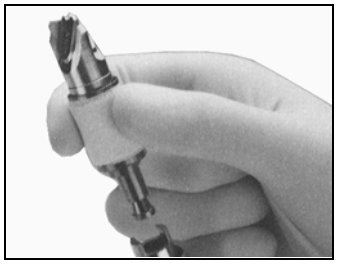
3.3 Cranial Perforator Drive (E9015) Operation

NOTES:

1. **The handpiece cord button and all front panel buttons are disabled when using the E9015 Cranial Perforator Drive.**
2. **The Cranial Perforator Drive operates only in the forward direction up to 750 rpm and has no oscillate or reverse mode.**
3. **The Cranial Perforator Drive accepts Hudson shank accessories.**

1. To insert a perforator cutter:
   (a) Retract the chuck sleeve.

   (b) Insert the perforator cutter into the chuck until it is fully seated.



   (c) Release the chuck sleeve to lock the perforator cutter in place.
   (d) Pull on the perforator cutter to ensure it is securely locked in place.
2. To activate the handpiece, depress either the left or right footswitch pedal.

Group 2 Handpieces

NOTES:

1. **Group 2 handpieces consist of the *MicroChoice* levered and non-levered Drills (5020-021, -025, -026), Saws (5020-022, -023, -024), and Modular Handpiece (5020-027).**
2. **Group 2 handpieces will operate on the *PowerPro* controller, E9000 controller and the Advantage controller, in either Port 2 (Top Portion of controller) or Port 3 (Bottom Portion of controller) and function identically in either port.**
3. **The Low Speed Drill (5020-026) will not operate in Port 3 (Bottom Portion of Advantage controller).**
4. **The *MicroChoice* Modular Handpiece (5020-027) will not operate by a footswitch.**

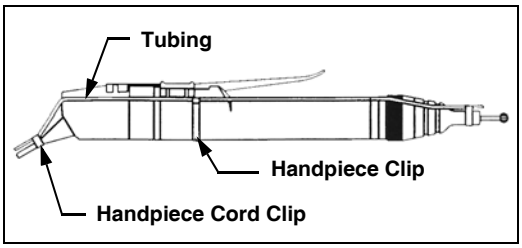
3.4 *MicroChoice* Drills

3.4.1 Tubing Set Attachment (E9418) for *MicroChoice* Handpieces

1. To attach the E9418 irrigation tubing set to the *MicroChoice* handpieces:

   (a) Securely press the tubing into the slot of the irrigation handpiece clip (5040-130).

   (b) Attach the clip to the back of the handpiece.



   (c) Snap the handpiece cord clips onto the handpiece cable to secure the tubing.

2. There are several irrigation tip configurations that allow irrigation with a specific handpiece (See **“6.1 Handpieces, Attachments and Accessories” on page 149**). Attach the appropriate irrigation tip to the tubing and the handpiece.

3.4.2 Preoperative Functional Test for the *MicroChoice* Elite High Speed Drill

Prior to operating the *MicroChoice* Elite High Speed Drill (5020-025), perform the following preoperative tests to verify proper functioning. Any operating difficulties should be reported to your Sales Representative or ConMed Linvatec Customer Service.

1. Before operating the drill, check for:
   - any loose or missing parts
   - any physical damage
   - movable parts that do not move freely
2. Performance Testing:
   (a) Assemble the appropriate guard and bur according to the instructions on pages 74 through 79. **Warning: Ensure that the guard and bur are properly installed, otherwise injury to the patient or medical personnel can result.**

   (b) Operate the drill at 100,000 rpm for one minute according to operating instructions contained on pages 48 through 58. Monitor the drill for any of the following:

   •excessive noise

   •excessive vibration

   •the drill or bur guard are hot to the touch during the test procedure or during surgical use

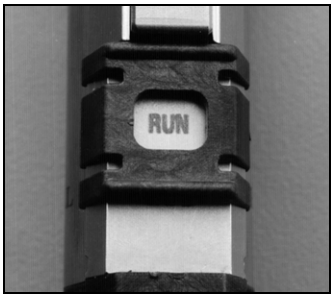
   •the drill does not operate up to its maximum preset speed (verify the maximum preset operating speed by fully depressing the drill activation lever or appropriate footswitch pedal and verifying that the maximum speed is displayed on the controller).

3.4.3 Elite High Speed (5020-025) and Medium Speed Drill (5020-021) Attachments and Accessories

PRECAUTION: Do not operate the *MicroChoice* Elite High Speed or Medium Speed Drills without the proper bur guard attached and the collet locked. Damage may result.

1. Prior to connecting any attachment or accessory, or while the handpiece is not in use, place the "SAFE/RUN" Slide in the "SAFE" position.

2. To attach bur guards, attachments and burs reference information on pages 75 to 79.
3. To operate the handpiece after the guard and bur are attached:
   (a) Place the "SAFE/RUN" Slide in the "RUN" position. The controller will display the handpiece I.D. and its maximum (default) operating speed.



Without any user input selections, each handpiece will initially operate at its default setting. Desired mode, direction, and speed settings can be stored in memory by following the instructions in **"2.1.3.2 Switch 1 - "Day-to-Day" Memory Storage Operation" on page 39**.

   (b) Depress the Activation Lever or the preferred footswitch pedal.

NOTE: If operating these handpieces in Port 3 of the Advantage controller, there is no footswitch capability.

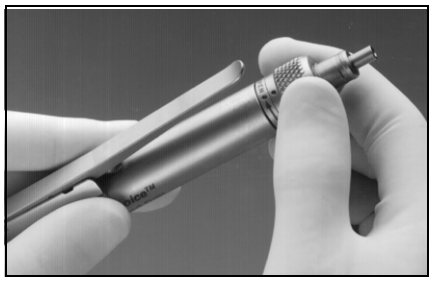
4. To change operating speeds, reference **"2.1.5 Controller Operation" on page 48** if operating from Port 2, or **"3.6.5.1 Handpiece Cord Button Operation Using the Elite High Speed Drill, Medium Speed Drill, Saws and Modular Handpiece" on page 93**.

3.4.3.1 Medium (5020-060), Long (5020-061) and Extra-Long (5020-062) Bur Guards

NOTE: Use only Hall Medium 5091 Series Burs with the Medium Bur Guard, Long 5092 Series Burs with the Long Bur Guard, and Extra-Long 5093 Series Burs with the Extra-Long Bur Guard.

1. To fasten a bur guard and bur to the handpiece:

   (a) Rotate the handpiece bur lock collar counterclockwise to the "OPEN" position.

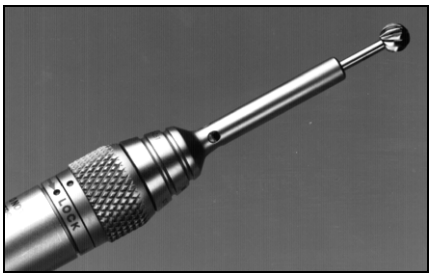


   (b) Slide the appropriate bur guard over the end of the drill. Ensure it is completely seated.

   (c) Insert the bur to the safe-line or until the bur seats completely.

Warning: Ensure the safe-line mark on the bur is not showing. Damage or injury may result. ⚠

   (d) Rotate the handpiece bur lock collar clockwise until the indicator dots are aligned in the "LOCK" position to lock the bur into place.



   (e) Pull on the bur to ensure it is locked in place.

2. To remove the bur and guard:

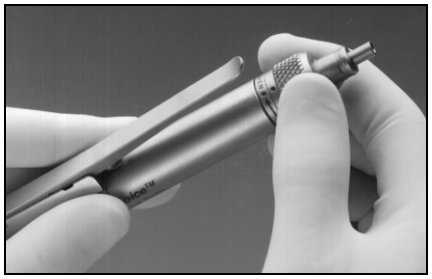
   (a) Twist the bur lock collar counterclockwise to the "OPEN" position and remove the bur and guard.

3.4.3.2 20° Angle (5020-063) and Extra-Long 20° Angle (5020-064) Attachments

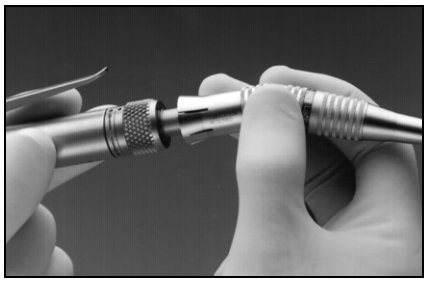
NOTE: Use only Hall Long 5092 Series Burs with the 20° Angle Attachment and only Hall Extra-long 5093 Series Burs with the 20° Extra-Long Attachment.

1. To fasten the attachment to the handpiece:

   (a) Rotate the handpiece bur lock collar counterclockwise to the "OPEN" position.



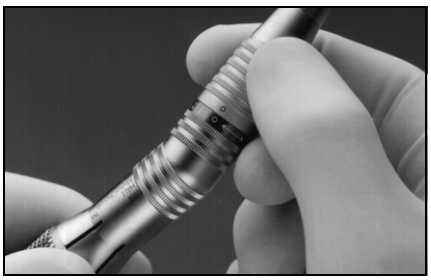
   (b) Slide the appropriate angle attachment completely over the end of the drill. Ensure it is seated completely.



   (c) Rotate the handpiece bur lock collar clockwise until the indicator dots are aligned in the "LOCK" position to lock the attachment in place.

2. To insert a bur:

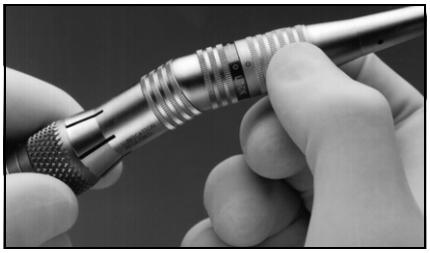
   (a) Rotate the attachment bur lock collar to the "OPEN" position.



   (b) Insert the bur to the safe line or until the bur seats completely.

Warning: Ensure the safe-line mark on the bur is not showing. Damage or injury may result. ⚠

   (c) Rotate the attachment bur lock collar until the indicator dots are aligned in the "LOCK" position to lock the bur into place.



   (d) Pull on the bur to ensure it is locked in place.

3. To remove the bur:

   (a) Rotate the attachment bur lock collar to the "OPEN" position, remove the bur.

4. To remove the guard:

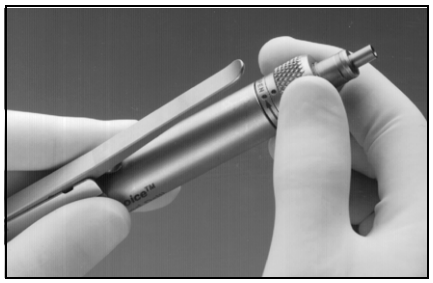
   (a) Rotate the handpiece bur lock collar to the "OPEN" position, remove guard.

3.4.3.3 70° Contra Angle with Surgical Head (5020-065), 70° Contra Angle with Dental Head (5020-069), and 90° Angle (5020-066) Attachments

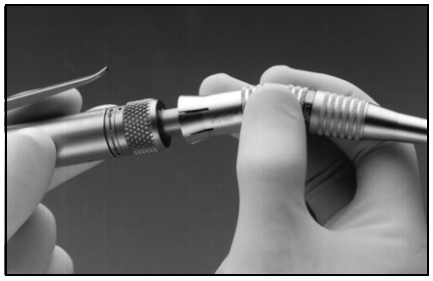
NOTE: Use only Hall Short 5090 Series and Extra-Short 5089 Series Burs with the 70° Contra-Angle Attachment and the 90° Angle Attachment.

1. To fasten the attachment to the handpiece:

   (a) Rotate the handpiece bur lock collar counterclockwise to the "OPEN" position.



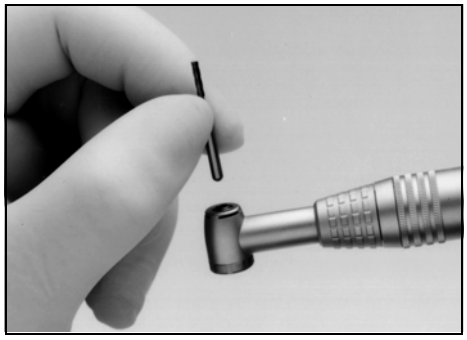
   (b) Slide the appropriate angle attachment over the end of the drill. Ensure it is completely seated.



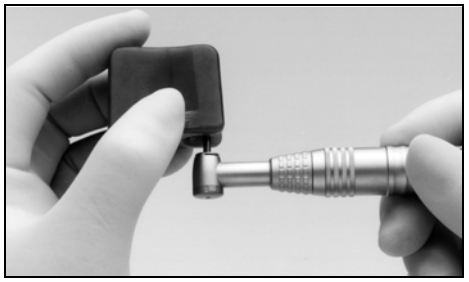
   (c) Rotate the handpiece bur lock collar clockwise until the indicator dots are aligned in the "LOCK" position to lock the attachment in place.

2. To insert a bur:

   (a) Place the bur in the opening on the attachment.



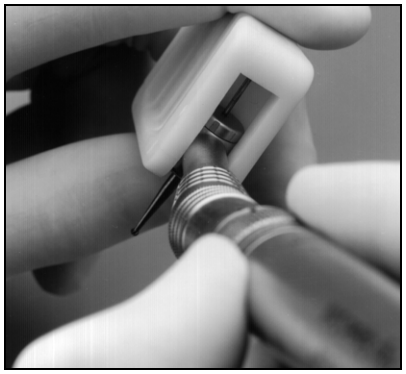
   (b) Use the grooved side of the bur changer (1375-003) to press the bur firmly in place.



PRECAUTION: After cleaning and prior to each sterilization, the angled attachments (5020-063, -064, -065, -066, and -069) must be lubricated to ensure proper performance. Reference "4.1.4 Attachment Lubricating Instructions" on page 122.

3. To remove the bur:

   (a) Place the bur changer in the opening at the rear of the attachment.



   (b) Press firmly on the bur changer to push the bur out.

4. To remove the attachment:

   (c) Rotate the handpiece bur lock collar to the "OPEN" position and remove the guard.

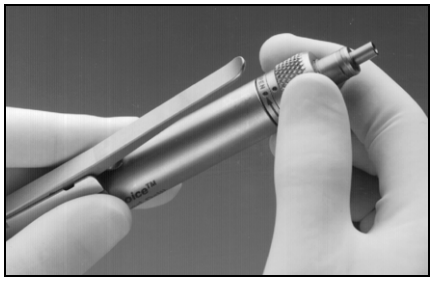
70° Contra Angle (5020-069) with Dental Head Attachment

The 70° Contra-Angle with Dental Head attachment uses friction grip burs only - size 1/16" or 1.58 mm in diameter. Friction grip burs of this diameter are not marketed by ConMed Linvatec. They are available through dental supply dealers.

3.4.3.4 Tissue Retractor Bur Guard (5020-068)

1. To fasten the attachment to the handpiece:

   (a) Rotate the handpiece bur lock collar counterclockwise to the "OPEN" position.



   (b) Slide the guard over the end of the drill. Ensure it is completely seated.

2. Insert the bur through the tip of the bur guard and into the handpiece collet. (Any 5092 series bur with a head diameter of 4mm or less. The recommended bur is 5092-136, Long Oval Cutting Bur).

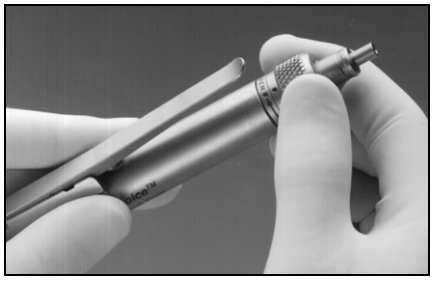
3. Rotate the handpiece bur lock collar clockwise until the indicator dots are aligned in the "LOCK" position to lock the bur into place.

3.4.3.5 Laminectomy Bur Guard (5020-067)

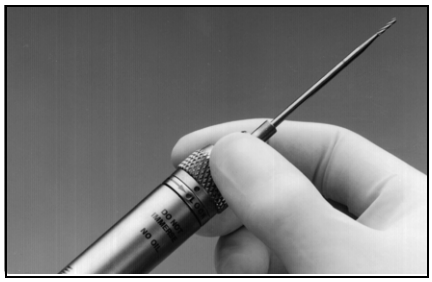
NOTES:

1. **Laminectomy burs are the only burs inserted prior to placing a guard or an attachment on the handpiece.**
2. **For additional information refer to the *MicroChoice* Angled Attachment Package Insert or the *MicroChoice* Bur Guard Package Insert.**

1. To fasten the bur to the handpiece:
   (a) Rotate the handpiece bur lock collar counterclockwise to the "OPEN" position.



   (b) Insert the correct bur (5092-103 shown).



   (c) Rotate the handpiece bur lock collar clockwise until the indicator dots are aligned in the "LOCK" position to lock the bur into place.
   (d) Pull on the bur to ensure it is locked in place.
2. To fasten the guard to the handpiece:
   (a) Slide the Laminectomy Guard over the bur and the end of the drill. Be certain the guard is completely seated.

3. To remove the guard:
   (a) Pull on the guard to remove it from the handpiece.
4. To remove the bur:
   (a) Rotate the handpiece bur lock collar counterclockwise to the "OPEN" position and remove the bur.

3.4.4 Low Speed Drill (5020-026) Operation

PRECAUTION: Make sure the head attachment matches the function selected. Improper head attachment selection may result in erroneous speed or torque.

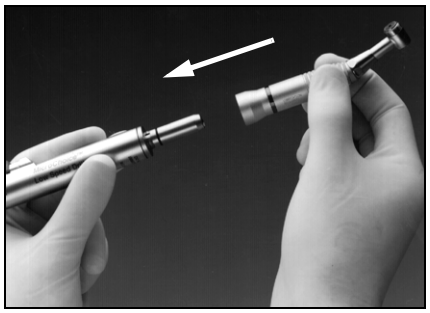
NOTES:

1. **The Low Speed Drill can only be operated by the footswitch. Therefore, it can only be operated on the E9000 controller or Port 2 of the Advantage controller (Top Portion of controller).**
2. **Always operate the Low Speed Drill with the appropriate attachment, either the Dental Implant Drill Head (5020-034) or the Implant Screw/Tap Head (5020-035).**
3. **The Low Speed Drill accepts standard dental latch burs or Hall Surgical burs of the 5088 series.**
4. **When the Low Speed Drill is set to "SCREW" or "TAP" mode, the speed is not variable in the reverse direction.**
5. **If 25 in. oz. is exceeded while using this handpiece, the handpiece will stop and "MAXIMUM TORQUE" will display. The handpiece can only be reset by secondary activation of the footswitch.**

1. To connect an attachment:

   (a) Place the "SAFE/RUN" Slide in the "SAFE" position. The controller will display the current operating mode (**"SCREW" "TAP" "DRILL"**), **"SAFE ON"**, and the set flow rate (**"OFF"** will display if irrigation is not being used).

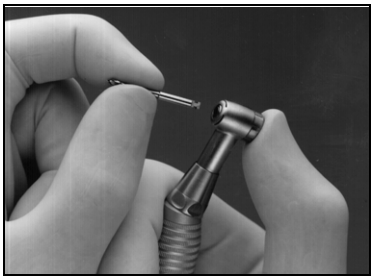
   (b) Slide the appropriate attachment over the front end of the handpiece and seat completely.



2. To insert a drill bit:

   (a) Depress the rear portion of the attachment head and insert the drill bit into the front opening.

   (b) Rotate the drill bit into place and release the attachment head.



   (c) Pull on the bit to ensure it is locked in place.

3. To remove the drill bit:

   (a) Depress the rear portion of the attachment head and pull the drill bit out.

4. To operate the handpiece:

   (a) Place the "SAFE/RUN" Slide in the "RUN" position. The controller will display the current operating mode, the handpiece maximum operating speed, and the set flow rate (**"OFF"** will display if irrigation is not being used).

   (b) Depress the preferred footswitch pedal.

5. To change the operating mode, reference **"3.6.5.2 Button Operation Using the Low Speed Drill" on page 94**.

6. To change handpiece speeds, reference **"2.1.5 Controller Operation" on page 48** or **"3.6.5.2 Button Operation Using the Low Speed Drill" on page 94**.

3.5 *MicroChoice* Saws

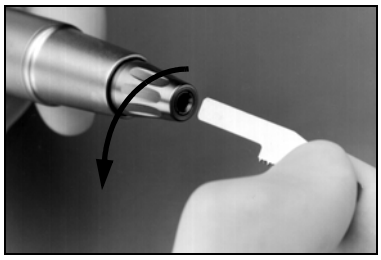
3.5.1 Reciprocating Saw (5020-023) Operation

NOTE: Use only Hall 5053 series flat or round shanked blades.

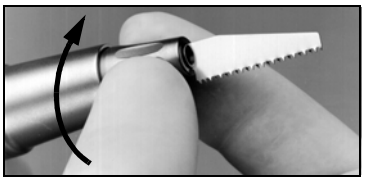
1. To insert a blade:

   (a) Place the "SAFE/RUN" Slide in the "SAFE" position.

   (b) Twist the blade lock collar counter-clockwise and insert the shank of the blade into the collet. Ensure the blade is fully seated.



   (c) Twist the blade lock collar clockwise and tighten securely.



2. Round shank blades can be seated at any position within a 360° range.

3. Verify the blade is securely tightened by briefly activating the handpiece. To activate the handpiece:

   (a) Place the "SAFE/RUN" Slide in the "RUN" position. The controller will display the handpiece I.D. and its maximum (default) rpm or speed setting. If being used in Port 2 of the Advantage controller, and irrigation is being used, the top display will also show the set flow rate (**"OFF"** will be displayed if irrigation is not used).

(b) Depress the Activation Lever or appropriate footswitch pedal.

(c) Place the handpiece back in the "SAFE" position.

(d) Retighten the blade locking collar.

4. To change operating speeds, reference **"2.1.5 Controller Operation" on page 48** if using Port 2 of the Advantage controller or **"3.6.5.1 Handpiece Cord Button Operation Using the Elite High Speed Drill, Medium Speed Drill, Saws and Modular Handpiece" on page 93**.

5. To remove blades:

(a) Place the "SAFE/RUN" Slide in the "SAFE" position.

(b) Twist the blade lock collar counter-clockwise and remove the blade.

3.5.2 Sagittal Saw (5022-022) Operation

NOTE: Use only Hall 5023 series blades.

PRECAUTIONS:

1. The blade collet lock mechanism must be completely closed to ensure the blade is held firmly in place.

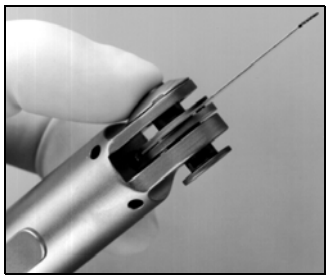
2. Do not use the XL Handpiece Activation Lever (5020-059) with the Sagittal Saw.

Warning: When using the PowerPro Sagittal Saw attachment (PRO2043), placing excessive bending or twisting force on the sagittal saw blade may cause the collet to open and release the saw blade. Do not use saw blades to pry, remove bone grafts, or as a leverage point. Patient or user injury could occur.

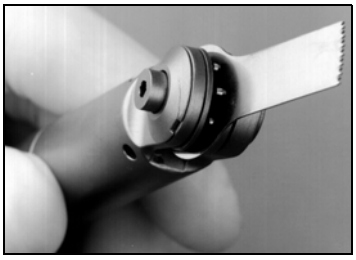
1. To attach blades:

(a) Place the "SAFE/RUN" Slide in the "SAFE" position.

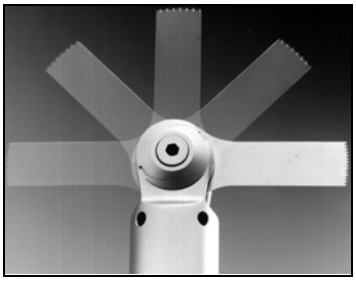
(b) Depress the collet lock mechanism to open the collet. Position the blade on the pins inside the collet.



(c) Depress the opposite side of the handpiece collet area to lock the blade into position.

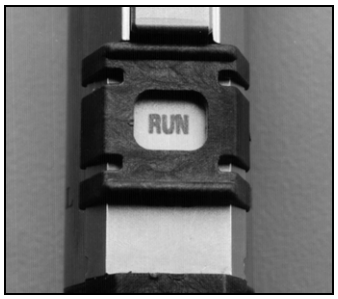


(d) Blades may be positioned at 45° intervals within a 180° arc.



2. Verify the blade is securely attached by activating the handpiece. To activate the handpiece:

   (a) Place the "SAFE/RUN" Slide in the "RUN" position. The controller will display the handpiece I.D. and its maximum (default) rpm or speed setting. If being used in Port 2 of the Advantage controller, and irrigation is being used, the top display will also show the set flow rate (**"OFF"** will be displayed if irrigation is not used).



   (b) Depress the Activation Lever or appropriate footswitch pedal.

3. To change operating speeds, reference **"2.1.5 Controller Operation" on page 48** if using Port 2 of the Advantage controller or **"3.6.5.1 Handpiece Cord Button Operation Using the Elite High Speed Drill, Medium Speed Drill, Saws and Modular Handpiece" on page 93**.

4. To remove saw blades:

   (a) Place the "SAFE/RUN" Slide in the "SAFE" position.

   (b) Depress the collet lock mechanism and remove the blade.

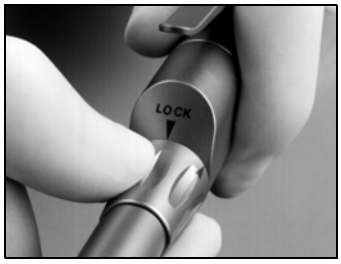
3.5.3 Oscillating Saw (5020-024) Operation

NOTE: Use only Hall 5023 series blades.

1. To attach saw blades:

   (a) Place the "SAFE/RUN" Slide in the "SAFE" position.

   (b) Twist the blade lock collar until the arrows are no longer aligned in the "LOCK" position.

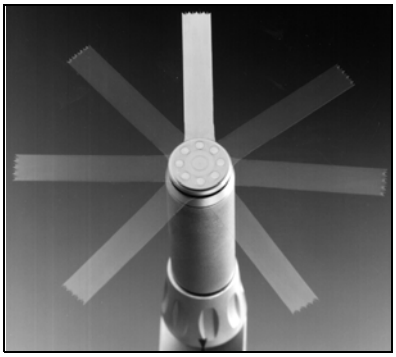


   (c) Position the blade on the pins inside the collet.

   (d) Twist the blade lock collar and align the arrows in the "LOCK" position to secure the blade.

PRECAUTION: The blade lock collar must be completely closed to ensure the blade is held firmly in place. ⚠

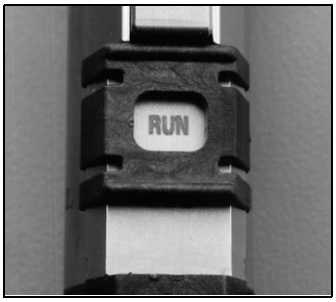
2. Blades may be positioned at 45° intervals within a 360° circumference of the collet.



3. Verify the blade is securely attached by briefly activating the handpiece.

4. To activate the handpiece:

   (a) Place the "SAFE/RUN" Slide in the "RUN" position. The controller will display the handpiece I.D. and its maximum (default) rpm or speed setting. If being used in Port 2 of the Advantage controller, and irrigation is being used, the top display will also show the set flow rate (**"OFF"** will be displayed if irrigation is not used).



   (b) Depress the Activation Lever or appropriate footswitch pedal.

5. To change operating speeds, reference **"2.1.5 Controller Operation" on page 48** if using Port 2 of the Advantage controller or **"3.6.5.1 Handpiece Cord Button Operation Using the Elite High Speed Drill, Medium Speed Drill, Saws and Modular Handpiece" on page 93**.

6. To remove saw blades:

   (a) Place the "SAFE/RUN" Slide in the "SAFE" position.

   (b) Twist the blade lock collar until the arrows are no longer aligned in the "LOCK" position and remove the blade.

3.5.4 Leverless Handpiece Operation

PRECAUTIONS:

1. Before attempting to remove the Handpiece Activation Lever, ALWAYS place the "SAFE/RUN" Slide in the "SAFE" position.

2. Always remove the Activation Lever when operating the handpiece with a footswitch.

3. If a footswitch is in use and the handpiece Activation Lever has not been removed, depressing the Activation Lever will not control the handpiece until use of the footswitch has been discontinued.

Warning: Do not use an XL Activation Lever (5020-059) with the Sagittal Saw. Injury may result.

1. To remove the handpiece Activation Lever:

   (a) Place the "SAFE/RUN" Slide in the "SAFE" position.

   (b) Depress the ribbed portion of the Activation Lever. Push towards the "SAFE/RUN" Slide until it disengages from the handpiece.

NOTE: If a levered handpiece is connected to the controller while disengaging the Lever, "MAGNETIC FIELD" will display if the controller is set to Text Display mode.

If the handpiece is being used in the *PowerPro* controller or Port 3 of the Advantage controller, and switch 5 is set to Graphical Display mode, the controller will display:

2. To reattach the handpiece Activation Lever:

   (a) Insert the Lever pins into the grooves and reverse the above steps.

NOTE: If the original Activation Lever is too short, remove it and attach an XL Handpiece Activation Lever (5020-059).

3.6 *MicroChoice* Modular Handpiece (5020-027), Attachments and Accessories

NOTE: The Modular Handpiece does not operate with a footswitch.

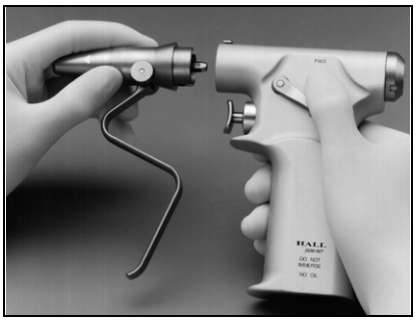
3.6.1 Connecting/Removing Attachments

All Modular Handpiece attachments connect/disconnect in the same manner. Reference pages 89 through 92 for attachment information.

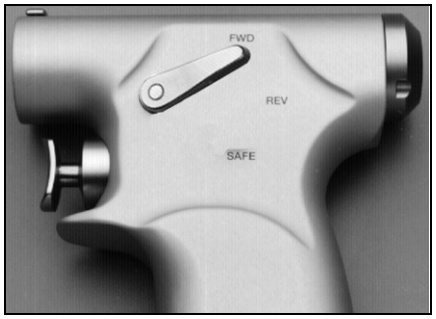
1. To connect an attachment:
   (a) Place the thumb lever in the "SAFE" position.

OBSOLETE

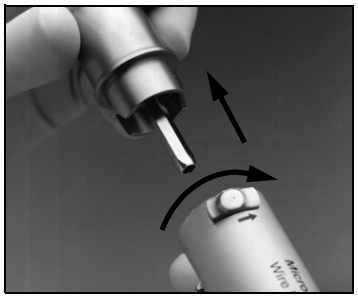
   (b) Orient the attachment shaft with the handpiece opening. Insert the shaft and press them until they snap together.



2. To operate the handpiece with any attachment connected:
   (a) Place the Thumb Lever in the "FWD" or "REV" position.



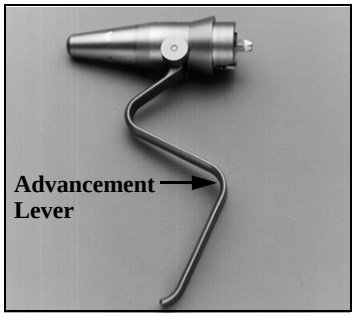
   (b) Depress the trigger to activate the handpiece.
3. To remove an attachment:
   (a) Place the thumb lever in the "SAFE" position.
   (b) Move the Slide Lock in the direction of the arrow and remove the attachment.



3.6.2 Pin and Wiredriver Attachments

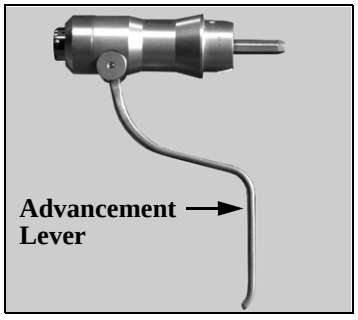
Insertion of pins and wires, and the functionality of the handpiece with either pins or wires, is the same with either attachment.

3.6.2.1 Wiredriver Attachment (5020-028)



The Wiredriver attachment cannulation accepts threaded or unthreaded K-Wires from 0.028 in. to 0.062 in. (0.7 mm to 1.6 mm).

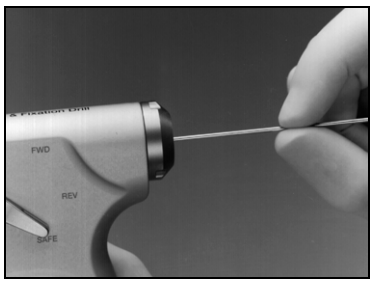
3.6.2.2 Pin Driver Attachment (5020-032)



The pin driver attachment cannulation accepts Steinman Pins from 0.079 in. to 0.125 in (2.0 mm to 3.2 mm).

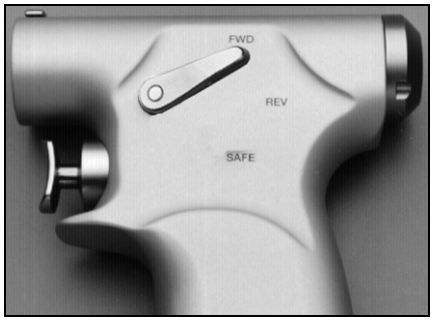
3.6.2.3 Pin and Wire Insertion

1. To insert a pin or wire:
   (a) Push the Advancement Lever forward, or away from the handpiece.
   (b) Insert the wire or pin, either from the front or rear of the handpiece.



2. To operate the handpiece:
   (a) Grip the wire or pin by squeezing the Advancement Lever.

(b) Place the thumb lever in the "FWD" (forward) position.



(c) Drive the wire or pin by squeezing the Advancement Lever and simultaneously depressing the trigger.

3. To reposition the handpiece on the wire or pin:

   (a) Release the trigger to stop rotation.

   (b) Release the Advancement Lever and push it forward.

   (c) Slide the handpiece along the wire or pin.

4. Follow step 2 to further drive the wire or pin.

5. To remove threaded wires from patient:

   (a) Insert the wire into the front of the attachment (see step 1).

   (b) Place the handpiece in the "REV" (reverse) position.

   (c) Simultaneously squeeze the Advancement Lever and depress the trigger.

6. The Wire Guard (5053-123) may be attached to the back of the handpiece to keep long wires or pins from bending, and for user protection.

NOTE: The wire or pin will not slip out of the attachment unless the Advancement Lever is pushed forward.

3.6.3 Universal Drill Attachment (5020-029)

Specifications:

Max. Operating:

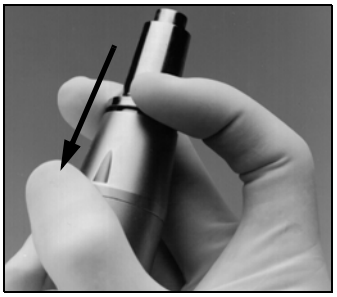
Speed: 1,000 rpm, forward or reverse

Settings: 10 to 100% in 10% increments

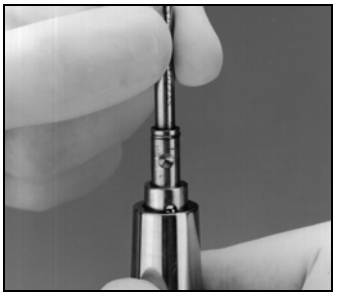
3.6.3.1 Trinkle Shank Accessories for the Universal Drill Attachment

1. To insert a Trinkle Shank accessory into the Universal Drill Attachment:

   (a) Pull the Universal Drill Attachment collet sleeve back.



   (b) Align the dimple on the trinkle shank with the black arrow on the outer collet sleeve. Totally insert the trinkle shank. The spring-loaded inner sleeve will retract.



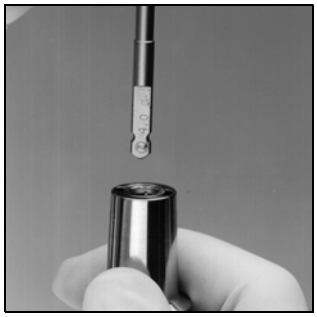
   (c) Release the collet sleeve and rotate the accessory until it is completely engaged. Pull the accessory firmly to ensure proper engagement.

2. To remove accessory, pull back the outer collet sleeve and remove the accessory.

3.6.3.2 AO Drill Bits for the Universal Drill Attachment

1. To insert an AO Drill Bit into the Universal Drill Attachment.

   (a) Align the flat portion of the drill shank with the black arrow on the outer collet sleeve.



   (b) Insert the drill shank into the collet as far as it will go without pulling back the collet sleeve. Twist the shank to make sure it is aligned properly. If it is, it will not spin in the collet.

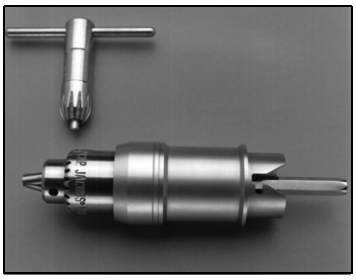
   (c) Pull back on the collet sleeve and push the shank completely into the collet.

   (d) Release the collet sleeve. The shank is now locked into the collet. Pull the drill bit firmly to verify it is properly seated.

2. To remove the drill bit, pull back on the collet sleeve and remove the bit.

3.6.4 All Jacobs Chuck Attachments

NOTE: The associated catalog numbers are: 5020-030, 5020-031, 5020-041, 5020-042.

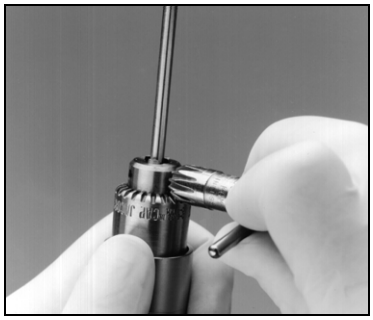


Specifications - Operating Speeds:

Jacobs Chuck:	1,000 rpm, forward or reverse
High Torque Jacobs Chuck:	275 rpm, forward or reverse
Speed Settings:	10 to 100% in 10% increments

NOTE: The High Torque Jacobs Chuck has a 3.5:1 gear ratio reduction.

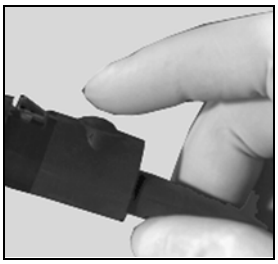
1. Connect any Jacobs Chuck attachment to the handpiece (See **"3.6.1 Connecting/ Removing Attachments" on page 88**).
2. Insert an accessory into the chuck and secure it with the appropriate key (999-052 for 1/4" chucks and 999-053 for 5/32").



3.6.5 Group 2 Handpiece Cord Button Operation

The Advantage, *PowerPro* and E9000 Controllers allow the user complete system control from within the sterile field. Speed settings can be changed using the handpiece cord button.

3.6.5.1 Handpiece Cord Button Operation Using the Elite High Speed Drill, Medium Speed Drill, Saws and Modular Handpiece



1. To enter the Speed menu, press the handpiece cord button either two or three times, quickly.
   (a) Pressing the handpiece cord button twice allows the user to decrease the operating speed.
   (b) Pressing the handpiece cord button three times allows the user to increase the operating speed.
2. After entering the Speed menu, the attached handpiece I.D. will display along with the current operating speed (the speed will be blinking). Press the handpiece cord button to change speed.

   The Speed menu will scroll when the minimum or maximum speeds are reached.
3. When the desired speed is reached, stop pressing the button. After a few seconds the speed menu will time out. The handpiece is now ready for use.

Handpiece Speed Adjustment

To enter the menu options to adjust the handpiece speed, press the handpiece cord button two or three times.

Text Display Mode

The menu will default to the speed menu and display the attached handpiece and the current speed setting.

"HIGH SPEED" **"###K RPM"**

"###" is blinking

Press the handpiece cord button until the desired speed is displayed. Stop pressing the button.

Graphics Display Mode (*PowerPro* controller and Advantage controller, Port 3 Only)

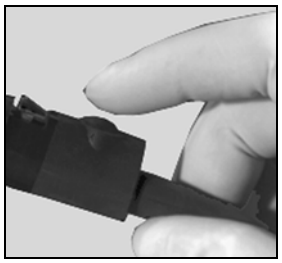
70K RPM

100K RPM

3.6.5.2 Button Operation Using the Low Speed Drill

NOTE: This applies to the E9000 and Port 2 Only of the Advantage controller.

1. To enter the Mode menu, press the handpiece cord button either two or three times, quickly.



   (a) Pressing the handpiece cord button twice allows the user to decrease the operating speed.

   (b) Pressing the handpiece cord button three times allows the user to increase the operating speed.

2. After entering the Mode menu, the possible function selections display; **"SCREW" "TAP" "DRILL"**. The current function will be blinking. Press the handpiece cord button until the desired function is blinking. Discontinue pressing.

PRECAUTION: Ensure the head attachment matches the function selected. Improper head attachment selection may result in erroneous speed or torque.

3. The speed is now displayed and blinking. Press the handpiece cord button until the desired speed is displayed.

   The Speed menu will scroll until the minimum or maximum speeds are reached.

4. When the desired speed is reached, stop pressing the button. After a few seconds the new operating speed will stop blinking. The handpiece is now ready for use.

Group 3 Handpieces

PRECAUTION: Operating the shaver blade or bur without fluid flow (dry) may cause damage to the device or cause the plastic hub to seize (melt).

NOTES:

1. **Group 3 handpieces consist of *MicroChoice* (MC9820, MC9828, MC9840), Advantage (D9820, D9824, D9920, D9924), and APEX (C9820, C9824, C9828, C9840) Shaver Handpieces.**
2. **When using the *MicroChoice* (MC9820) and Advantage (D9820, D9920) Basic Shaver Handpieces, and *MicroChoice* Small Shaver Handpiece (MC9840) on the Advantage controller, they can ONLY be operated from Port 2 (Top portion) using a footswitch. For footswitch operation, see "2.1.7 Footswitch Operation (Advantage Top Portion Only, PowerPro and E9000)" on page 55.**
3. **When using the APEX Basic Large Shaver Handpiece (C9820) and APEX Small Shaver Handpiece (C9840) on the Advantage controller, they can be operated from either Port 1 or 2. However, to use them in Port 2 the E9320 APEX Adapter must be used and can only be controlled using a footswitch. For footswitch operation information, see "2.1.7 Footswitch Operation (Advantage Top Portion Only, PowerPro and E9000)" on page 55.**
4. **The following handpieces cannot be used in Port 3 of the Advantage Controller because they require a footswitch to operate and there is no footswitch associated with Port 3 (C9820, MC9820, C9840, MC9840, D9820, and D9920).**
5. **The APEX Full-Function (C9828), and 2-Button (C9824) Shaver Handpieces can be operated from all ports of the Advantage Controller using the handpiece buttons. However, to operate these hand-pieces from Ports 2 and 3 the E9320 APEX Adapter must be used. They can also be operated from Ports 1 or 2 using a footswitch. For footswitch operation, see "2.1.7 Footswitch Operation (Advantage Top Portion Only, PowerPro and E9000)" on page 55.**
6. **The *MicroChoice* Full-Function (MC9828) and Advantage 2-Button (D9824, D9924) Shaver Handpieces can be operated from Ports 2 or 3 of the Advantage Controller using the handpiece buttons. They can also be operated from Port 2 using a footswitch. For footswitch operation, see "2.1.7 Footswitch Operation (Advantage Top Portion Only, PowerPro and E9000)" on page 55.**

3.7 Preoperative Functional Test for Group 3 Shaver Handpieces

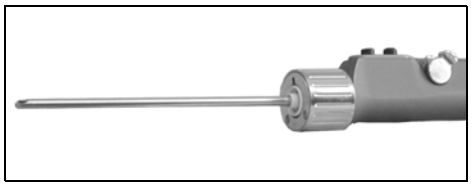
Prior to operating any of the Group 3 Shaver Handpieces, perform the following preoperative tests to verify proper functioning. Any operating difficulties should be reported to your Sales Representative or ConMed Linvatec Customer Service.

1. Before operating a shaver handpiece, check for:
   - any loose or missing parts
   - any physical damage
   - movable parts that do not move freely
2. Performance Testing:
   (a) Connect the handpiece to the appropriate controller port according to instructions on pages 31 through 36.
   (b) Verify that the controller properly recognizes the attached handpiece.
   (c) Activate the handpiece by pressing and releasing the handpiece ON/OFF button, if applicable, or the appropriate footswitch pedal. Monitor the handpiece for any of the following and then stop the handpiece by pressing the ON/OFF button again or releasing the footswitch pedal:
   •excessive noise
   •excessive vibration
   •abnormal heat rise during the test procedure or during surgical use

3.8 Accessory Insertion and Removal

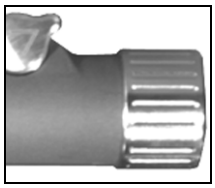
3.8.1 Advantage Basic (D9820/D9920) and 2-Button (D9824/D9924) Shaver Handpieces

1. To install a shaver blade:
   (a) Align the key on the blade hub with the slot in the collet.
   (b) Completely insert the blade hub into the collet until it snaps and locks into place.



   (c) Pull out on the blade to ensure it is locked into place.
2. To remove the blade:
   (a) Rotate and hold the collet to the "UNLOCK" position and remove the blade.

3. To operate the suction port valve on these shaver handpieces:
   (a) To open the suction port, move the suction port valve to the "ON", or forward position.



   (b) To shut suction off, move the suction port valve to the "OFF", or rear position.

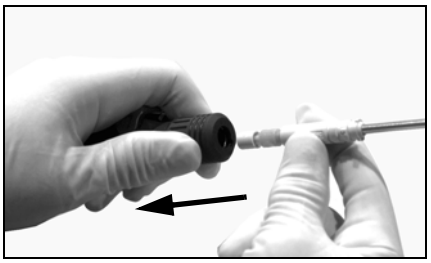
3.8.2 Small Shaver Handpieces (MC9840, C9840)

NOTE: If irrigation is being utilized, the E9416 (4.2 mm) or E9417 (3.7) Tubing Set must be used.

Accessory insertion and removal:

1. To install a shaver blade into the handpiece:

   (a) While pulling the quick-connect locking collet back towards the body of the handpiece, completely insert the shaver blade hub into the collet.



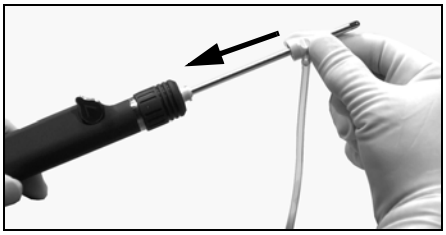
   (b) Release the locking collet. The shaver blade is now locked into place.

   (c) The shaver blade cutting window may be placed in any position by simply rotating the collet, which allows 360° positioning of the blade cutting window.

2. To remove the blade, repeat the above steps and pull the blade out.

3. **If irrigation is being** utilized**, and the E9416 or E9417 Tubing Set is being used, perform the following;**

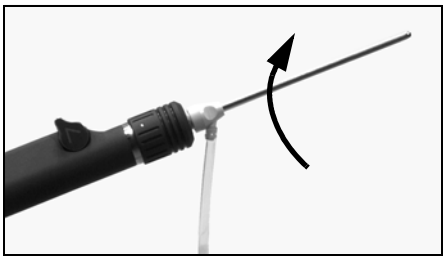
   (a) Slide the tubing set irrigation collar over the distal end of the shaver blade toward the shaver blade hub.



NOTE: The irrigator collar must be installed prior to bending the blade. See blade insert sheet for blade bending information.

   (b) Slide the inner recesses of the collar completely over the two hub-ears on the shaver blade hub.

   (c) Turn the irrigation collar clockwise (approximately 90°) and securely lock it into place.



   (d) Snap the handpiece cord clips onto the handpiece cable to secure the tubing.

3.9 Group 3 Handpiece Operation

3.9.1 Activating the Handpiece

3.9.1.1 Activating the Handpiece with the Footswitch

NOTE: This process applies to ALL shaver handpieces.

1. To activate these handpieces, depress the appropriate footswitch pedal (see **"2.1.7 Footswitch Operation (Advantage Top Portion Only, PowerPro and E9000)" on page 55**).

3.9.1.2 Activating the Handpiece with the Handpiece ON/OFF Button

NOTE: This process applies ONLY to the APEX and Advantage 2-Button Handpieces (C9824, D9824/D9924), and the APEX and *MicroChoice* Full-Function Handpieces (C9828, MC9828).

1. To activate these handpieces, press and release the handpiece ON/OFF button.

3.9.2 Changing Handpiece Speeds

3.9.2.1 Using the Controller Speed Buttons to Change Speed

NOTE: This process applies to ALL shaver handpieces (C9820, D9820, D9920, MC9820, C9824, D9824, D9924, C9828, MC9828, C9840, MC9840) and pertains to the E9000 Controller and Port 1 and Port 2 ONLY of the Advantage Controller.

1. To change operating speeds using the E9000 or Advantage (Top Portion Only) controller buttons, press the controller Speed Increase or Decrease buttons.

Advantage Controller

E9000 Controller

3.9.2.2 Using the Handpiece Direction Select and ON/OFF Buttons to Change Speed

NOTE: This process applies ONLY to the APEX Full-Function (C9828) and APEX (C9824) and Advantage (D9824/D9924) 2-Button Handpieces.

1. The "Direction" and "On/Off" button function can be changed to "Increase Speed" and "Decrease Speed" respectively. To change the button functionality:

   (a) Stop the handpiece. Press and hold the Direction Select Button to enter the speed menu. An audible beep will sound twice indicating that the handpiece button function has changed. Release the button. To increase the speed, press this button again until the desired speed is obtained.

   (b) To decrease the speed, press the handpiece On/Off button.

   (c) When no further speed change is requested, the audible beep will sound twice again indicating that the button functionality has returned to "Direction" and "On/Off" control.

3.9.2.3 Using the Handpiece Speed Buttons to Change Speed

NOTE: This process applies ONLY to the APEX (C9828) and *MicroChoice* (MC9828) Full-Function Handpieces.

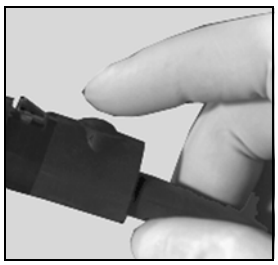
1. Press the handpiece Increase button to increase the handpiece speed. The speed will change incrementally. When the button is pressed and held, the speed will change continuously

2. Press the handpiece Decrease button to decrease the handpiece speed. The speed will change incrementally. When the button is pressed and held, the speed will change continuously.

3.9.2.4 Using the Handpiece Cord Button to Change Speed

NOTE: The following information applies only to the *MicroChoice* Basic (MC9820), and Full-Function (MC9828) Shaver Handpieces.

1. To enter the Speed menu, quickly press the handpiece cord button either two or three times.



   (a) Pressing the handpiece cord button twice allows the user to decrease the operating speed.

   (b) Pressing the handpiece cord button three times allows the user to increase the operating speed.

2. After entering the Speed menu, the operating speed will blink. Press the handpiece cord button to change the speed.

   (a) To change the speed incrementally, press and release the button.

   (b) To change the speed continuously, press and hold the button.

3. When the desired speed is obtained, stop pressing the button. After a few seconds the new operating speed will stop blinking. The shaver handpiece is now ready to use at the new speed setting.

3.9.3 Changing Handpiece Operating Directions

3.9.3.1 Using the Footswitch to Change Handpiece Direction (Applies only to the 2-Pedal Footswitch - 5020-053)

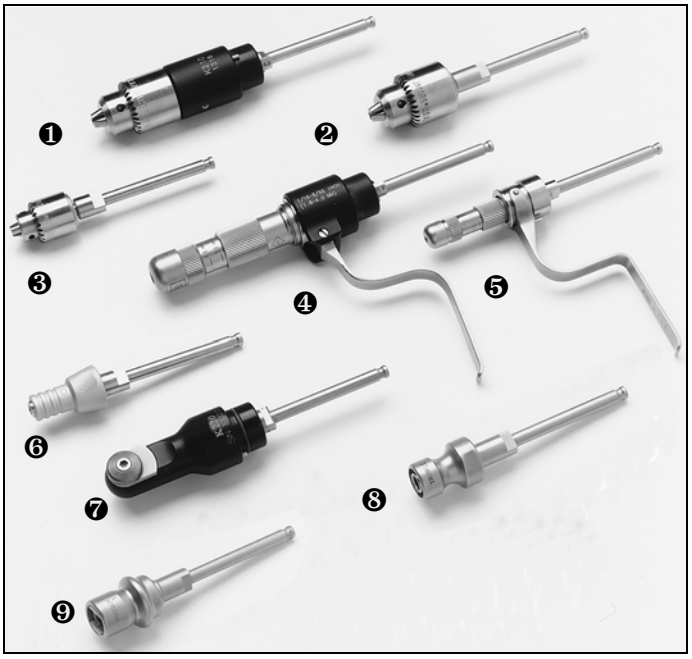
NOTE: This process applies to ALL shaver handpieces (C9820, D9820, D9920, MC9820, C9824, D9824, D9924, C9828, MC9828, C9840, MC9840) operating on the *PowerPro* controller, E9000 controller or Port 1 or Port 2 of the Advantage controller.

1. To change operating directions between forward, reverse, and oscillate on these handpieces, depress the left footswitch pedal (see **"2.1.7 Footswitch Operation (Advantage Top Portion Only, PowerPro and E9000)" on page 55**).

3.9.3.2 Using the Handpiece Direction Select Button to Change Handpiece Direction

NOTE: This process applies ONLY to the APEX 2-Button (C9824) and Full-Function (C9828) Handpieces, the *MicroChoice* Full-Function (MC9828) Handpiece, and the Advantage 2-Button (D9824/D9924) Handpiece.

1. Press and release the Direction Select button to change operating directions between forward, reverse, and oscillate. A beep will sound every time the button is pressed and the controller will indicate the selected direction. If audio is enabled via the "CONTROLLER OPTIONS/FUNCTION" switches (Ports 1 and 2 only on the Advantage controller) the direction will be pronounced (See **"2.1.3.4 Switch 3 - Audio Selection" on page 41**).



3.10 Mini-Driver Handpiece, Attachments and Accessories

3.10.1 Attachments and Accessories

1. High Torque Jacobs Chuck (K210)
2. 1/4” Jacobs Chuck (K109)
3. 5/32” Jacobs Chuck (K110)
4. Automatic Pin Driver (K211)
5. Automatic Wire Driver (K111A)
6. ASIF/AO Twist Drill Chuck (K114A)
7. Sagittal Saw (K220)
8. Hudson Chuck (K113)
9. Trinkle Chuck (K112)

3.10.2 Connecting/Removing Attachments

All Mini-Driver Handpiece attachments connect/disconnect in the same manner. See **“3.10 Mini-Driver Handpiece, Attachments and Accessories” on page 102** for attachment information.

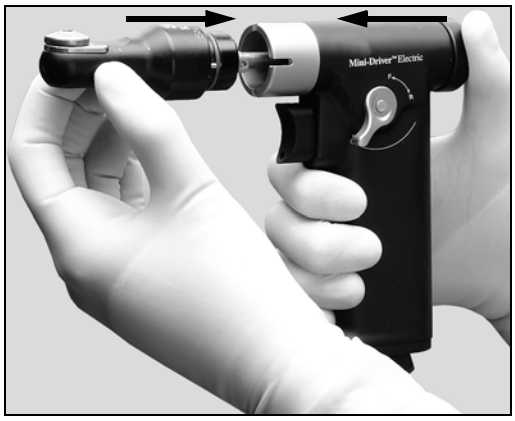
1. To connect an attachment:

   (a) Ensure the handpiece is in the safe or off position.

   (b) Press the lock/release collet and insert the arbor end of the attachment into the handpiece. Release the lock/release collet to secure the attachment to the handpiece.

   (c) Ensure the attachment is secure by pulling it outward.

NOTE: On attachments that contain alignment pins, guide the alignment pin into one of the four available slots on the nosepiece.

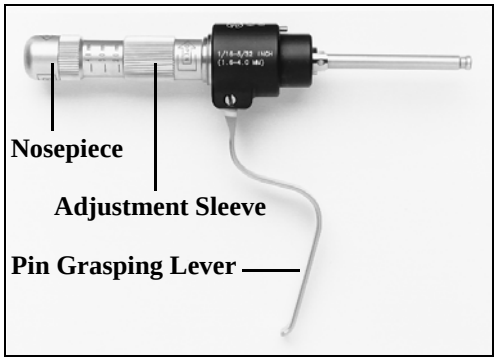


(d) To remove the attachment, repeat steps 1(a) and 1(b) and pull out the attachment.

3.10.3 Pin and Wiredriver Attachments

Insertion of pins and wires, and the functionality of the handpiece with either pins or wires, is the same with either attachment.

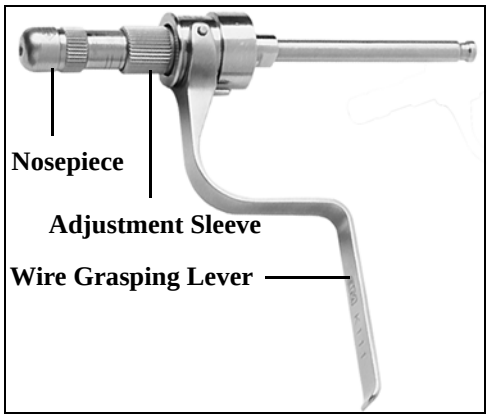
3.10.3.1 Pin Driver Attachment (K211)



The Automatic Pin Driver is designed to drive pins (wires) and drill bits compatible with the specifications below:

Through Cannulation:	1.6 - 4.0 mm
	(0.062 in to 0.156 in.)
	(1/16 - 5/32 in.)

3.10.3.2 Wiredriver Attachment (K111A)



The Automatic Wire Driver has a quick release for easy wire insertion, removal and advancement.

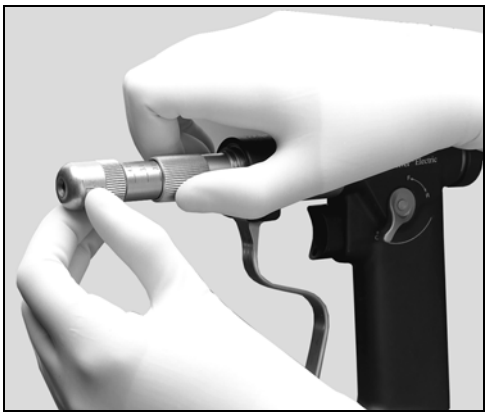
Through Cannulation:	0.7 - 1.8 mm
	(0.028 in to 0.071in.)
	(1/32 - 5/64 in.)

3.10.3.3 Pin and Wire Insertion

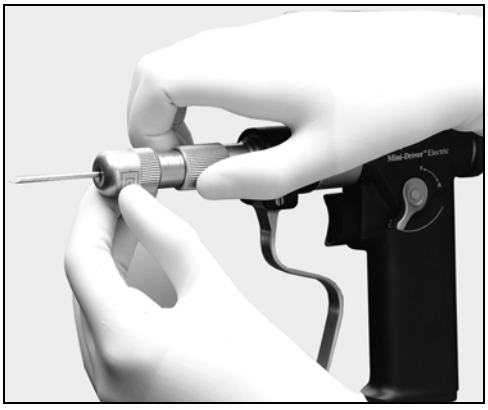
1. To insert a pin or wire:

   (a) Ensure the handpiece is in the safe or off position before inserting or removing a pin or wire.

   (b) Rotate the adjustment sleeve until the desired pin/wire size graduation appears on the shaft of the nosepiece.



   (c) Insert the pin or wire. While holding the nosepiece, tighten the adjustment sleeve until the pin or wire is held firmly in place.



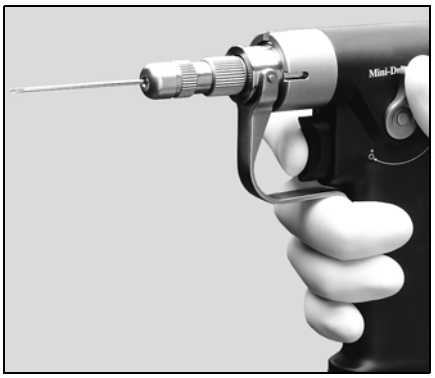
(d) Loosen the adjustment sleeve one half turn. The pin or wire should slide freely within the Pin/Wire Driver until the grasping lever is depressed.

(e) For pin/wire sizes that fall between the pin/wire size graduation, loosen the adjustment sleeve one full turn. The pin or wire should slide freely within the Pin/Wire Driver until the grasping lever is depressed.

2. To operate the handpiece:

(a) Release the safety and place the handpiece in the forward position.

(b) To grip and drive the wire or pin, depress the grasping lever until flush with the handpiece and depress the trigger.



3. To reposition the handpiece on the wire or pin:

(a) Release the trigger and grasping lever.

(b) Slide the handpiece along the wire or pin.

(c) Follow step 2 to further drive the wire or pin.

4. To remove threaded wires from the patient:

(a) Insert the wire into the front of the attachment (see step 1(a) through 1(e)).

(b) Place the handpiece in the reverse position.

(c) Simultaneously squeeze the grasping lever and depress the trigger.

3.10.4 Sagittal Saw Attachment (K220)

NOTES:

1. **The K220 Sagittal Saw attachment only accepts K140 and K150 series blades.**
2. **For more precise osteotomies, lower cutting temperatures, and reduced instrument wear, use a new blade for each procedure.**
3. **Sagittal Saw blades are single use only. Dispose of properly after use.**

1. To attach the Sagittal Saw attachment, reference **"3.10.2 Connecting/Removing Attachments" on page 102**.

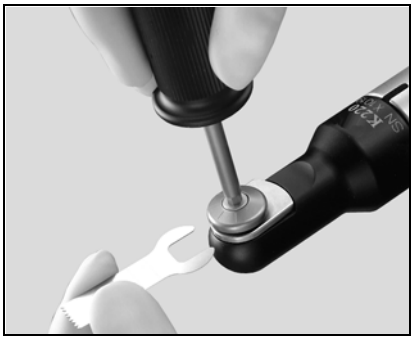
2. The Sagittal Saw attachment may be placed in any of four positions at 90 degree angles.

3. To attach a blade:

   (a) Ensure the handpiece is in the safe, or off position before attaching or removing blades.

   (b) Insert the blade into the blade holder in the desired blade position. Blades may be placed in any of five positions with a 180 degree radius.

   (c) Tighten the blade by inserting the K201 Wrench and turning clockwise until secure.

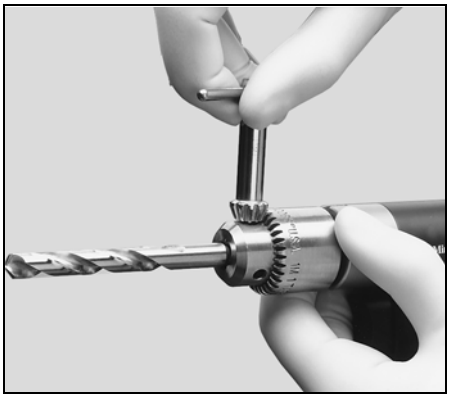


   (d) Ensure the blade is secured by pulling outward on the blade.

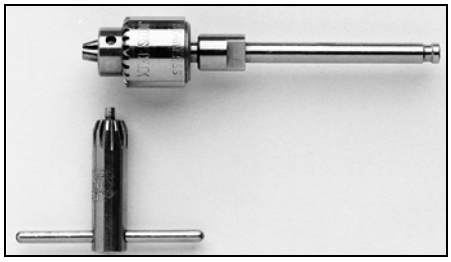
4. To operate the handpiece, release the safety and depress the trigger.
5. To remove a blade:
   (a) Ensure the handpiece is in the safe, or off position.
   (b) Insert the wrench and turn counterclockwise while simultaneously pulling the blade out.

3.10.5 All Jacobs Chuck Attachments

1. To attach any Jacobs Chuck attachment, reference **“3.10.2 Connecting/Removing Attachments” on page 102**).
2. Insert the desired accessory into the chuck and secure it with the appropriate key.



3.10.5.1 5/32” Jacobs Chuck (K110)

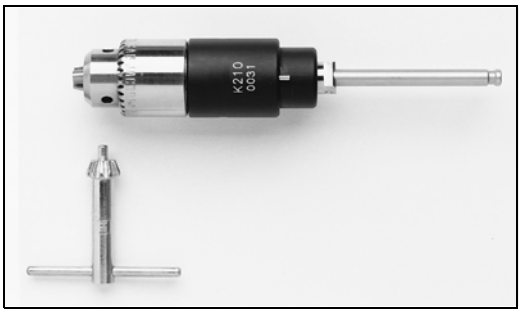


This attachment is designed to drive straight plain shank twist drill bits, pins, and wires compatible with the specifications below:

Specifications:

Jaw Cannulation:	0 - 4.0 mm (0 to 0.156 in.) (0 to 5/32 in.)
Through Cannulation:	4.0 mm (0.156 in.) (5/32 in.)
Associated Chuck Key:	D298K

3.10.5.2 1/4” Jacobs Chuck (K109)

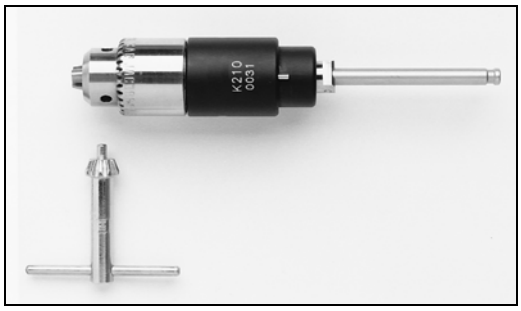


This attachment is designed to drive straight shank twist drill bits, pins, and wires compatible with the specifications below:

Specifications:

Jaw Cannulation:	0 - 6.35 mm (0 to 0.25 in.) (0 to 1/4 in.)
Through Cannulation:	4.0 mm (0.156 in.) (5/32 in.)
Associated Chuck Key:	D298L or 5044-999-52

3.10.5.3 High-Torque Jacobs Chuck (K210)

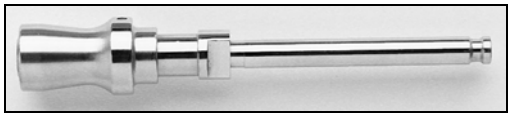


This attachment is designed to drive large (6 mm - 14 mm) cannulated drill bits and pins. Accepts drill bits and other accessories compatible with the specifications below:

Specifications:

Jaw Cannulation:	0 - 6.35 mm (0 to 0.25 in.) (0 to 1/4 in.)
Through Cannulation:	2.4 mm (0.094 in.) (3/32 in.)
Associated Chuck Key:	D298L or 5044-999-52

3.10.6 Trinkle Chuck Attachment (K112)

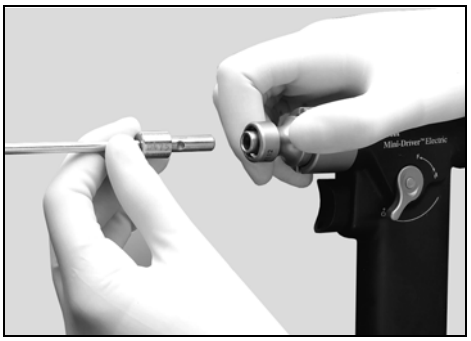


This attachment is designed to drive drill bits, automatic screwdrivers, and other accessories with Trinkle fittings.

Specifications:

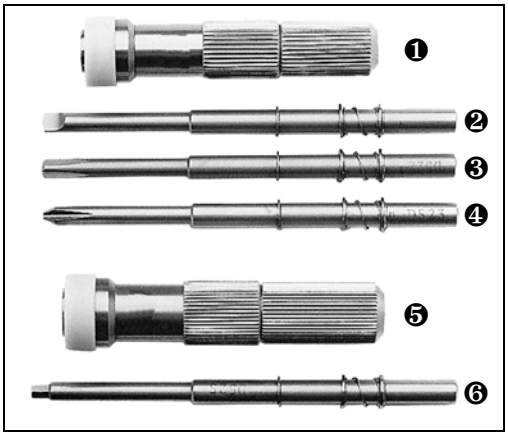
Through Cannulation:	4.0 mm (0.156 in.) (5/32 in.)

1. To attach a Trinkle Chuck attachment, reference **"3.10.2 Connecting/Removing Attachments" on page 102**).
2. To insert a Trinkle Shank accessory into the Trinkle Chuck attachment:
   (a) Pull the locking sleeve chuck back. Insert the accessory and release the locking sleeve.



   (b) Ensure the attachment is secure by pulling it outward.
   (c) Ensure the accessory is securely seated in the attachment before use by pulling outward on it.
3. To remove accessory, pull back the locking sleeve chuck and remove the accessory.

3.10.6.1 Automatic Screwdrivers for the Trinkle Chuck Attachment (D520/D524)

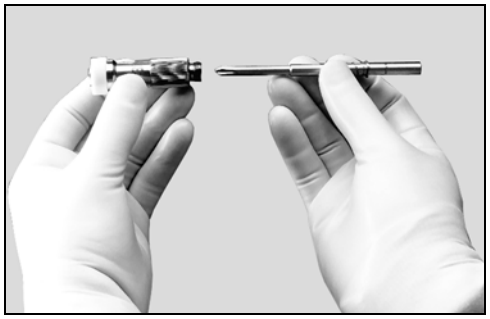


1. Screwdriver (D520)
2. Slotted Bit (D521)
3. Cruciate Bit (D522)
4. Phillips Bit (D523)
5. Screwdriver (D524)
6. Hex Bit for AO type screws (D525)

1. To insert a bit into the screwdriver.

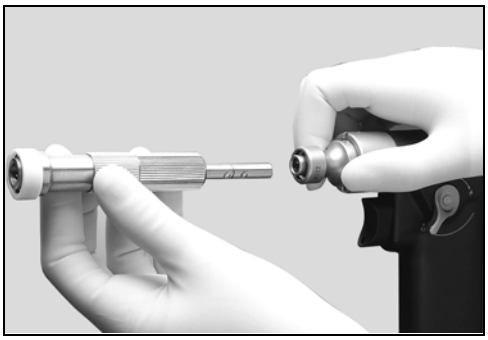
   (a) Unscrew the bit retainer section (counterclockwise) from the screwdriver.

   (b) Insert the bit into the back of the screwdriver, tip first.



   (c) Slide the bit retainer over the bit and thread the retainer back on the screwdriver by turning it clockwise until tight.

   (d) While retracting the locking sleeve on the Trinkle Chuck attachment, insert the screwdriver into the chuck and release the locking sleeve.

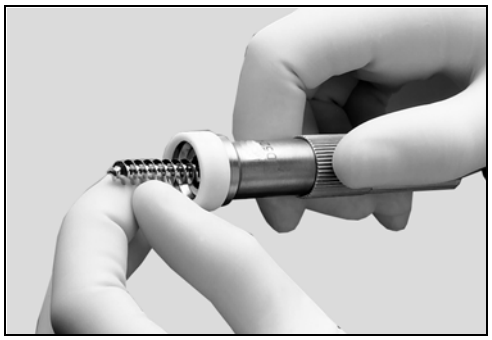


PRECAUTION: Ensure that the screwdriver is securely seated in the Trinkle Chuck before use.

2. To engage the screwdriver bit into the screw head.

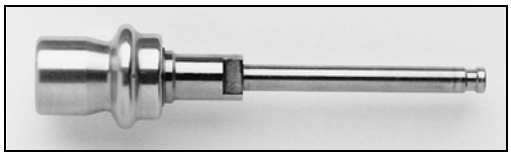
   (a) Insert the head of the screw into the screwdriver.

   (b) Hold the screw firmly and press the knurled portion of the screwdriver body forward so the teflon collar snaps over the head of the screw.



3. To remove the screw, retract the teflon collar and remove the screw.

3.10.7 Hudson Chuck Attachment (K113)

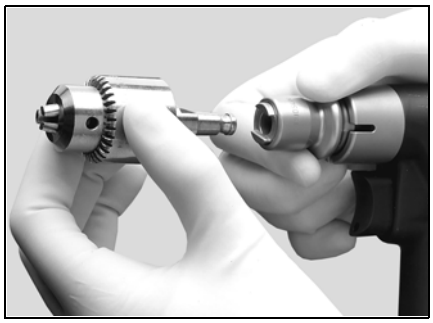


This attachment is designed to drive accessories with Hudson type fittings.

Specifications:

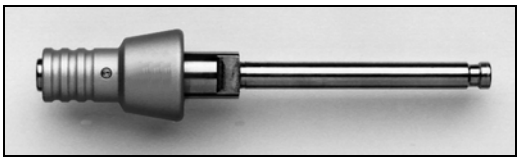
Through Cannulation:	4.0 mm (0.156 in.) (5/32 in.)

1. To attach a Hudson Chuck attachment, reference **“3.10.2 Connecting/Removing Attachments” on page 102**).
2. To insert a Hudson Shank accessory into the Hudson Chuck attachment:
   (a) Pull the locking sleeve chuck back. Insert the accessory and release the locking sleeve.



   (b) Ensure the accessory is fully seated by pulling outward on it.

3.10.8 ASIF/AO Twist Drill Chuck Attachment (K114A)

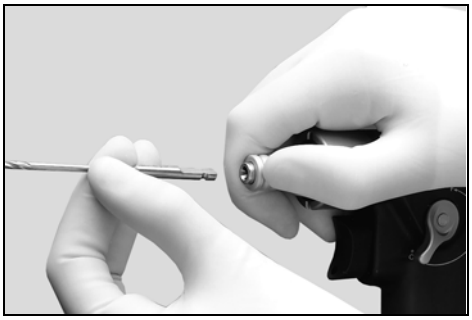


This attachment is designed to drive drill bits with ASIF/AO (Synthes) type fittings.

Specifications:

Through Cannulation:	3.2 mm (0.125 in.) (1/8 in.)

1. To attach an ASIF/AO Drill Chuck attachment, reference **“3.10.2 Connecting/Removing Attachments” on page 102**).
2. To insert an ASIF/AO drill bit into the an ASIF/AO Drill Chuck attachment:
   (a) Pull the locking sleeve chuck back. Insert the accessory and release the locking sleeve.



   (b) Ensure the drill bit is fully seated by pulling outward on it.

3.11 Handpiece Default Settings

Handpiece	Default Speed	Irrigation
High Speed Shaver (E9005)	5,000 rpm (forward/reverse) 3,000 rpm (Oscillate)	Off
Cool Flex High Speed Drill:	60,000 rpm	
(with E9414 Tube Set):		Preset
(with E9415 Tube Set):		50%
Cranial Perforator Drive (E9015):	750 rpm	NA
Elite High Speed Drill (5020-025)	70,000 rpm	Off
Medium Speed Drill (5020-021)	25,000 rpm	Off
Low Speed Drill (5020-026)		
Drill Mode:	2,500 rpm	Off
Screw/Tap Mode:	30 rpm	Off
Reciprocating Saw (5020-023)	100%	Off
Sagittal Saw (5020-022)	100%	Off
Oscillating Saw (5020-024)	100%	Off
Modular Handpiece (5020-027)	100%	Off
Mini-Driver Handpiece (K500)	1,250 rpm	Off
Small Shaver Handpiece (MC9840/C9840)	See page 113.	Off
Basic Shaver Handpieces (MC9820/C9820)	Blade Dependent (See page 113)	Off
2- Button Shaver Handpieces (C9824)	Blade Dependent (See page 113)	Off
Full-Function Shaver Handpiece (MC9828/C9828)	Blade Dependent (See page 113)	Off
Advantage Shavers (D9820/D9824)	Blade Dependent (See page 113)	Off
Advantage Turbo Shavers (D9920/D9924)	Blade Dependent (See page 113)	Off

Description	Speed Default	Speed Range
Small Shaver Handpiece (C9840, MC9840)	FWD/REV 3000 rpm	300-5000 rpm
	OSC. 500 rpm	300-2,500 rpm

The following information pertains to APEX handpieces (C9820, C9824, C9828, MC9820, MC9828)

Low Speed Shaver Blade	FWD/REV 1500 rpm	300 - 6000 rpm
	OSC. 500 rpm	300 - 1500 rpm
High Speed Shaver Blade	FWD/REV 2500 rpm	300 - 6000 rpm
	OSC. 500 rpm	300 - 1500 rpm
Low Speed Bur	3500 rpm	300 - 3500 rpm
High Speed Bur	6000 rpm	300 - 6000 rpm

The following information pertains to the Advantage Handpieces (D9820, D9824, D9920 and D9924):

Description	Speed Default	Speed Range
Low Speed Shaver Blade	FWD/REV 2000 rpm (Top Port - D3000 or E9000)	500 - 6000 rpm
	FWD/REV 2100 rpm (Bottom Port D3000 or PRO2000)	500 - 6000 rpm
	OSC. 1500 rpm	500 - 2500 rpm
High Speed Shaver Blade	FWD/REV 2000 rpm (Top Port - D3000 or E9000)	500 - 6000 rpm
	FWD/REV 2100 rpm (Bottom Port D3000 or PRO2000)	500 - 6000 rpm
	OSC. 1500 rpm	500 - 2500 rpm
High Speed Bur (D9820, D9824)	7000 rpm	500 - 10,000 rpm
High Speed Bur (D9920, D9924)	7000 rpm	500 - 12,000 rpm

4.0 MAINTENANCE

This section explains the importance of keeping your Advantage, *PowerPro* and E9000 Systems well maintained. It contains a maintenance schedule to assist you in determining the maintenance interval requirements of your instruments.

Regular and proper maintenance of your Advantage, *PowerPro* and E9000 Systems are the best way to protect your investment. It is essential that you have your powered surgical instruments serviced as scheduled so as to retain their optimum performance and reliability, which will reward you with safer, less problematic product performance over time. The following maintenance schedule specifies which Advantage, *PowerPro* and E9000 Systems instruments need attention and how often you should have them serviced.

The service and time intervals shown in the maintenance schedule assume you will use the Advantage, *PowerPro* and E9000 Systems instruments as indicated in this manual, including proper day-to-day operation, cleaning, and sterilization. Proper care and handling of the instruments on a day-to-day basis are extremely important to ensure safe and efficient operation. Refer to sections 2.0 and 3.0 of this instruction manual for information on proper system installation and operation and section 4.0 for proper day-to-day maintenance.

Your ConMed Linvatec authorized service center is the most knowledgeable about the Advantage, *PowerPro* and E9000 Systems instruments and will provide competent and efficient service. Service at ConMed Linvatec at the indicated service intervals is mandatory to keep your product warranties in effect. Any services and/or repairs done by any unauthorized repair facility may result in reduced performance of the instruments or instrument failure which may also compromise patient/user safety.

Table 1: Maintenance Schedule

Catalog Number	Product Description	(Months) 6	12	24	36
D3000/D3000I D3000J	Advantage Controller				•
E9000/E9000G E9000J	E9000 Controller		•		
PRO2000/ PRO2000I	*PowerPro* Controller				•
5020-021	*MicroChoice* Medium Speed Drill		•		
5020-022	*MicroChoice* Sagittal Saw	•			
5020-023	*MicroChoice* Reciprocating Saw		•		
5020-024	*MicroChoice* Oscillating Saw		•		
5020-025	*MicroChoice* Elite High Speed Drill	•			
5020-026	*MicroChoice* Low Speed Drill		•		
5020-027	*MicroChoice* Modular Handpiece		•		
5020-028	Wire Driver Attachment		•		
5020-029	Universal Drill Attachment		•		
5020-030	5/32” Jacobs Chuck Attachment		•		
5020-031	5/32” High Torque Jacobs Chuck Attachment		•		
5020-032	Pin Driver Attachment		•		
5020-034	Dental Implant Drill Head		•		
5020-035	Dental Implant Screw/Tap Head		•		
5020-041	1/4” Jacobs Chuck Attachment		•		
5020-042	1/4” High Torque Jacobs Chuck Attachment		•		
5020-063	20° Angle Attachment		•		
5020-064	Extra-Long 20° Angle Attachment		•		
5020-065	70° Contra Angle Attachment w/ Surgical Head		•		
5020-066	90° Angle Attachment		•		
5020-069	70° Contra Angle Attachment w/ Dental Head		•		

Table 1: Maintenance Schedule

Catalog Number	Product Description	(Months) 6	12	24	36
MC9820	*MicroChoice* Basic Shaver Handpiece	•			
MC9828	*MicroChoice* Full-Function Shaver Handpiece	•			
MC9840	*MicroChoice* Small Shaver Handpiece	•			
K500	Mini-Driver Electric Handpiece	•			
K109	1/4” Jacobs Chuck Attachment			•	
K110	5/32” Jacobs Chuck Attachment			•	
K111A	Automatic Wire Driver Attachment			•	
K112	Trinkle Chuck Attachment			•	
K113	Hudson Chuck Attachment			•	
K114A	ASIF/AO Twist Drill Chuck Attachment			•	
K210	High Torque Jacobs Chuck Attach.			•	
K211	Automatic Pin Driver Attachment			•	
K220	Sagittal Saw Attachment		•		
D9820/D9920	Advantage Basic Shaver Handpiece		•		
D9824/D9924	Advantage 2-Button Shaver Handpiece		•		
E9005	High Speed Shaver Handpiece	•			
E9010	CoolFlex High Speed Drill Handpiece	•			
E9015	Cranial Perforator Drive	•			
PRO2100E	*PowerPro* Electric Modular Handpiece		•		
PRO2200E	*PowerPro* Electric Two-Trigger Handpiece		•		
PRO2300E	*PowerPro* Electric Oscillator Handpiece		•		
PRO6100	*PowerPro* Electric II Modular Handpiece		•		
PRO6125	*PowerPro* Electric II Oscillator Handpiece		•		
PRO6135	*PowerPro* Electric II Reciprocator Handpiece		•		

Table 1: Maintenance Schedule

Catalog Number	Product Description	(Months) 6	12	24	36
	Guards				
5020-060	*MicroChoice* Medium Bur Guard	•			
5020-061	*MicroChoice* Long Bur Guard	•			
5020-062	*MicroChoice* Extra-Long Bur Guard	•			
5020-067	*MicroChoice* Laminectomy Guard	•			
5020-068	*MicroChoice* Tissue Retractor Guard	•			
E9011-1	Medium Bur Guard	•			
E9011-2	Long Bur Guard	•			
E9011-3	Extra-Long Bur Guard	•			
E9011-7	Short Neuro Guard	•			
E9011-8	Medium Neuro Guard	•			
E9011-9	Long Neuro Guard	•			

WARNING: Failure to follow the maintenance schedule above could result in reduced instrument performance or overheating of the handpiece or attachment. In addition, heavy use of the handpiece exceeding the recommended duty cycle can cause the handpiece to overheat. Refer to "5.0 TECHNICAL SPECIFICATIONS" on page 133 for the associated handpiece duty cycle. Overheating can lead to possible burn injury to the patient or medical personnel. Rotation of handpiece usage per day will assist with proper performance.

4.1 Cleaning and Sterilizing

4.1.1 Cleaning Precautions

1. Follow universal precautions for protective apparel when handling and cleaning contaminated instruments.
2. Clean instruments within 30 minutes after use to minimize the potential of blood and debris drying prior to cleaning.
3. After use, shaver blades and burs may be a potential biohazard and should be handled in accordance with acceptable medical practice and applicable local and national requirements.
4. Dispose of all non-reusable tubing sets, irrigation tips, burs, saw blades and bits properly after use.

5. Do not lubricate any handpieces.

6. **Do not immerse the controller, K501 Mini-Adapter, E9320 APEX Adapter, footswitches, attachments, or handpieces (unless indicated - see "4.1.3 Handpiece Cleaning Instructions" on page 118).**

7. For aluminum surfaces, a neutral-pH agent should be used. To prevent corrosion, avoid contact with strong alkaline solutions (pH over 10.5) or agents containing iodine or chlorine.
8. Never clean handpieces with bleach, chlorine-based detergents, liquid or chemical disinfectants, or any products containing sodium hydroxide (i.e., INSTRU-KLENZ, Buell Cleaner). They will degrade the coatings.
9. Never clean equipment in an ultrasonic cleaner or a combination washer/sterilizer.

4.1.2 Controller and Footswitch Cleaning Instructions

1. Disconnect the controller from the electrical power source.
2. Wipe the controller, footswitch, Mini-Adapter (K501) and APEX Adapter (E9320) with a clean, soft cloth dampened with a mild, pH-balanced detergent.
   (a) Thoroughly clean the tubing cassette roller area on the controller. Ensure rollers are free of all debris.
   (b) Be sure to wipe the underside of the footswitch to ensure no metal objects have attached themselves.
3. Wipe equipment again with distilled or sterilized water to prevent metal discoloration.

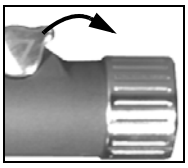
4.1.3 Handpiece Cleaning Instructions

Clean handpieces and attachments as soon as possible after use.

4.1.3.1 *MicroChoice*, Advantage, and APEX Shaver Handpiece Cleaning Instructions

NOTE: The following cleaning instructions apply to the following *MicroChoice*, APEX, and Advantage Shaver Handpieces: MC9820/C9820/D9820/D9920 Basic Handpieces, C9824/D9824/D9924 2-Button Handpieces, MC9828/C9828 Full-Function Handpieces, and MC9840/C9840 Small Shaver Handpieces.

1. Disconnect the handpiece cord from the controller prior to cleaning.
2. Remove all accessories (i.e., burs, shaver blades) from the handpiece prior to cleaning.
3. Ensure the suction control valve is in the "ON", or forward position prior to cleaning.



4. This step applies ONLY to the MC9820 Basic, MC9828 Full-Function, and MC9840 Small Shaver handpieces (older version with removable handpiece cords):
   (a) Remove the handpiece cord from the handpiece prior to cleaning and/or immersing in water for cleaning.
5. Thoroughly scrub the handpiece and handpiece cord with a clean, soft brush dampened with a mild, pH-balanced detergent. Remove all traces of blood, debris and stains. **Do Not immerse** equipment in soap solution or rinse water, other than the handpieces indicated previously in step 5.
6. Clean the suction tube thoroughly with a cleaning brush until all debris is removed.
   (a) Feed the wire end of the cleaning brush through the back of the handpiece. Repeat until all debris is removed.
7. Manipulate all moving parts of the handpiece to ensure all debris is removed. If not, clean again until all debris is removed.
8. Rinse under running water, or immerse the handpieces that can be immersed as indicated previously in step 4, to remove all traces of soap.
9. Flush all surfaces free of tap water with distilled water to prevent metal discoloration.
10. Gently shake the equipment free of water and wipe the surfaces with a clean, lint-free towel.

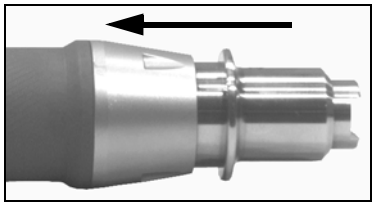
4.1.3.2 E9000 Handpiece Cleaning Instructions

NOTE: The following cleaning instructions apply to the following handpieces: E9005, CoolFlex, and E9015.

1. Remove all attachments (i.e., bur guards) and accessories (i.e., bits, burs) from the handpiece prior to cleaning.
2. Disconnect the handpiece cord from the controller prior to cleaning.
3. Ensure the handpiece cord is securely fastened to the handpiece during cleaning.

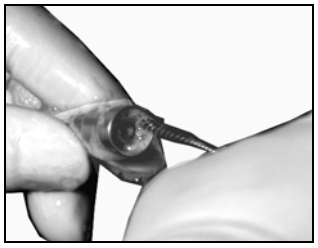
4. With the nose of the handpiece facing downward, thoroughly scrub the handpiece, handpiece cord, and guards with a clean, soft brush dampened with a mild, pH-balanced detergent. Remove all traces of blood, debris and stains. **Do Not immerse** equipment in soap solution or rinse water.

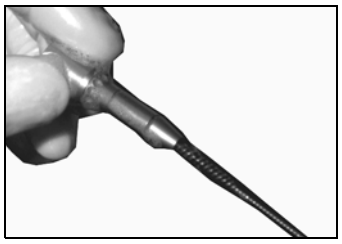
   (a) On the Cranial Perforator Drive (E9015) thoroughly clean the chuck by pulling the chuck sleeve back and scrubbing the area with a soft bristled brush.



   (b) On the CoolFlex High Speed Drill, thoroughly clean the collet area with a soft bristled brush.

   (c) Using a cleaning brush, thoroughly clean the inside of the bur guard. Repeat until all debris is removed.





5. Manipulate all moving parts of the handpiece to ensure all debris is removed. If not, clean again until all debris is removed.
6. Keeping the nose of the handpiece pointed downward, rinse under running water to remove all traces of soap.
7. Flush all surfaces free of tap water with distilled water to prevent metal discoloration.
8. Shake the equipment free of water and wipe the surfaces with a clean, lint-free towel.

4.1.3.3 *MicroChoice* Drills, Saws, Modular Handpiece, and Mini-Driver Handpiece Cleaning Instructions

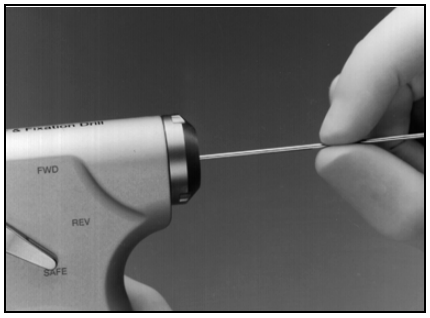
1. Remove all attachments (i.e., chucks, saws) and accessories (i.e., saw blades, burs) from the handpiece prior to cleaning. For levered handpieces, remove the Activation Lever (Reference **"3.5.4 Leverless Handpiece Operation" on page 87** for removal information).
2. Disconnect the handpiece cord from the controller prior to cleaning.
3. Ensure the handpiece cord is securely fastened to the handpiece during cleaning.

4. With the nose of the handpiece facing downward, thoroughly scrub the handpiece, handpiece cord, attachments, and activation lever, if applicable, with a clean, soft brush dampened with a mild, pH-balanced detergent. Remove all traces of blood, debris and stains. **Do Not immerse** equipment in soap solution or rinse water.

5. To clean the cannulated section of the *MicroChoice* Modular, and Mini-Driver handpieces:

   (a) If using a wire guard, if applicable, remove it from the handpiece.

   (b) Feed the wire end of a cleaning brush through the back of the handpiece.



   (c) Pull the brush through the handpiece. Repeat until all debris is removed.

6. Manipulate all moving parts of the handpiece and attachments to ensure all debris is removed. If not, clean again until all debris is removed.

7. Keeping the nose of the handpiece pointed downward, rinse under running water to remove all traces of soap. Rinse all attachments likewise.

8. Flush all surfaces free of tap water with distilled water to prevent metal discoloration.

9. Gently shake the equipment free of water and wipe the surfaces with a clean, lint-free towel.

4.1.4 Attachment Lubricating Instructions

PRECAUTIONS:

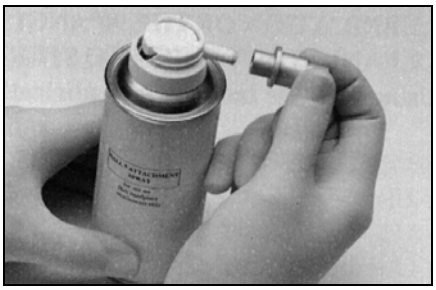
1. Only the 20° (5020-063, 5020-064), 70° (5020-065, 5020-069), and 90° (5020-066) angle attachments, the following Low Speed Drill Attachments (5020-034, 5020-035), and the *MicroChoice* Wiredriver Attachment (5020-028) are to be lubricated. Do not lubricate any handpieces or other attachments.

2. Attachments must be cleaned prior to lubrication.

3. Use only Pana Spray Attachment Lubricant (1375-037).

WARNING: The spray container is pressurized and the contents are flammable (contains LP gas). Do not expose can to temperatures exceeding 40°C (104° F). Do not puncture or burn can, even when empty. Do not spray on or near open flames or incandescent material.

1. Before using, shake the can well. Read all the information and instructions on the spray can label.
2. If the spray nozzle is not attached, securely attach it to the spray can dispenser.



3. Completely insert the spray nozzle in the bottom of the attachment.

4. With the can in an upright position, depress the button and spray the lubricant for one to two seconds or until lubricant flowing from the attachment is clear and free of traces of blood. Wipe any excess lubricant from the attachment.
5. After lubrication is complete, connect the attachment to the handpiece and operate for approximately 15 seconds.

4.1.5 Sterilization Information

Steam sterilization is safe and effective and has no contraindications for its use in sterilizing powered surgical handpieces, attachments and accessories.

4.1.5.1 Sterilization Warnings, Precautions and Notes

WARNING: The use of disinfecting solutions for an exterior instrument wipe will not sterilize the equipment and is not recommended.

1. Do not sterilize equipment with Ethylene Oxide (EtO).
2. Do not sterilize the controller or the 3-Pedal Footswitch (C9863).

3. Never sterilize any handpiece in a Washer/ Sterilizer, STERIS System, Abtox Plazlyte™ or comparable sterilization methods.
4. Do not sterilize handpieces in cold sterilants like CIDEX.
5. **Do Not** "Peel Pack" handpieces or attachments for sterilization. Sterilization in a sealed pouch traps moisture which can cause damage.
6. ALWAYS lubricate the 20°, 70°, and 90° angle attachments, Low Speed Drill attachments, and the *MicroChoice* Wiredriver Attachment (5020-028) **prior** to sterilization. See **"4.1.4 Attachment Lubricating Instructions" on page 122**.
7. Handpieces with collet mechanisms and suction control valves must be sterilized with the collet and suction control valve **fully open**.
8. **Do not** run handpieces while warm. Allow adequate time for cooling prior to surgery. **Do not immerse** in liquid or cover with a damp cloth to cool. Cool by exposure to room temperature.

NOTES:

1. **Sterilization validation has been conducted in accordance with the requirements of AAMI TIR12.**
2. **Additional drying time may be required for complete heat and moisture dissipation. Operation of a handpiece or attachments that are not completely cool or dry may decrease performance and/or reliability.**

All handpieces, attachments and kits may be processed in a pre-vacuum steam sterilizer (Steam Pre-vacuum) or in a gravity (downward) displacement sterilizer (Steam Gravity). Place handpiece(s), handpiece cord(s), and/or attachments/accessories in an appropriate instrument tray or a fully perforated, wrapped container, when applicable. Follow the recommended minimum sterilization exposure times listed on the following pages.

Recommended minimum sterilization exposure times are as follows:

Table 2: Sterilization Parameters

Sterilization Type	Minimum Temperature	Recommended Minimum Exposure Time	Dry Time
Individual *MicroChoice* Drills and Saws (5020-021, -022, -023, -024, -025, -026, -027); Mini-Driver Handpiece (K500); Associated Attachments; 2-Pedal Footswitch (5020-053); and Handpiece Cords Sterilization Parameters			
Steam Pre-vacuum	270°F (132°C)	4 minutes	8 minutes minimum *
Steam Gravity	270°F (132°C)	15 minutes **	8 minutes minimum *
Steam Gravity	250°F (121°C)	60 minutes **	8 minutes minimum *
**** NOTE: If sterilizing bur guards in an instrument tray, add five (5) minutes to exposure times.**			
E9000 Otolaryngology (E9006) and Neurosurgery (E9007) Sterilization Case Configuration Sterilization Parameters			
Steam Pre-vacuum	270°F (132°C)	4 minutes	8 minutes minimum *
Steam Gravity	270°F (132°C)	25 minutes	8 minutes minimum *
Steam Gravity	250°F (121°C)	50 minutes	8 minutes minimum *
*** PRECAUTION: An eight (8) minute minimum dry cycle must be run on all handpieces, guards and attachments every time the product is sterilized. Failure to use a dry cycle on the products may lead to reduced product performance or premature product failure. Operation of a handpiece that is not completely cool or dry may decrease performance and/or reliability.**			
Individual High Speed Shaver (E9005), CoolFlex High Speed Drill (E9010), Cranial Perforator Drive (E9015), Advantage Shavers (D9820, D9824, D9920, D9924), *MicroChoice* Shaver Handpieces (MC9820, MC9828, MC9840), APEX Shaver Handpieces (C9820, C9824, C9828, C9840), Associated Attachments, and Handpiece Cords Sterilization Parameters			
Steam Pre-vacuum	270°F (132°C)	4 minutes	8 minutes minimum *
Steam Gravity	270°F (132°C)	10 minutes	8 minutes minimum *
*** PRECAUTION: An eight (8) minute minimum dry cycle must be run on all handpieces, guards and attachments every time the product is sterilized. Failure to use a dry cycle on the products may lead to reduced product performance or premature product failure. Operation of a handpiece that is not completely cool or dry may decrease performance and/or reliability.**			

Other Processes:

All *PowerPro* attachments have been approved for STERRAD[1] sterilization processes. Follow the manufacturer's recommended instructions for the sterilization process.

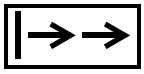
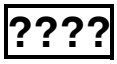
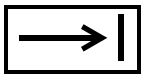
PRECAUTION: Use of STERRAD sterilization may affect the cosmetic appearance of some metallic finishes.

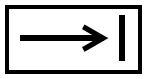
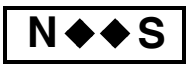
1. Sterrad is a registered trademark of Johnson & Johnson

4.2 Troubleshooting

Symptom	Possible Cause	Corrective Action
Controller does not power on when standby power switch is turned on.	♦ Power cord unplugged or faulty.	♦ Plug in power cord. ♦ Replace power cord.
	♦ Blown fuse(s).	♦ Replace fuses. Reference **"4.4 Fuse Replacement and Voltage Selection Means" on page 130**.
Handpiece does not operate.	♦ Handpiece cord not connected securely, if applicable.	♦ Securely connect handpiece cord to the handpiece, if applicable, and the controller receptacle.
	♦ Handpiece cord and/or button, if applicable, faulty.	♦ Replace handpiece cord, where applicable. If handpiece cord is permanently affixed, return handpiece for service.
	♦ Handpiece faulty.	♦ Return for service.
	♦ If using a footswitch, footswitch cord not connected securely.	♦ Securely connect footswitch cord to controller receptacle.
	♦ Footswitch cord or footswitch faulty.	♦ Return for service.
	♦ Handpiece safety is in the safe, or off position, if applicable.	♦ Move safety, if applicable, to the appropriate operating position.

Symptom	Possible Cause	Corrective Action
The CoolFlex High Speed Drill overheats.	♦ Tubing set is not completely primed.	♦ Prime tubing set by following the priming procedure (See **" E9414 Tubing Set with Recirculation only:" on page 69**.
A *MicroChoice*, Group 2 handpiece overheats.	♦ Worn bearings in the bur guard.	♦ Reference **"4.5 Bur Guard Testing Procedure" on page 131**. If resistance is noticed, return bur guard for service. If no resistance is noticed, return handpiece for service.
	♦ Moisture in the handpiece.	♦ Resterilize the handpiece according to sterilization parameters and drying times, reference **"4.1.5 Sterilization Information" on page 123**.
Leakage occurring at the tubing handpiece cassette and handpiece interface.	♦ Handpiece cassette not completely or incorrectly attached to the handpiece.	♦ Remove the tubing handpiece cassette from the handpiece and reinstall. If leakage still occurs, replace with a new tubing set.

Symptom	Possible Cause	Corrective Action
Error Messages		
"MOTOR OVER-SPEED"  **"CHECK HAND-PIECE"**  **"CANNOT ID HANDPIECE"** messages display.	♦ Handpiece, handpiece cord and/ or controller faulty.	♦ Replace handpiece. If symptom is corrected, return handpiece for service. ♦ Else, replace handpiece cord. If symptom is corrected, return faulty handpiece cord. ♦ Else, return controller for service. ♦ Remove both handpieces from the top section to clear the fault condition.
"STALL CHECK BUR LOCK"  message displays.	♦ Bur lock in open position. ♦ Handpiece, handpiece cord and/ or controller faulty.	♦ Put bur lock in lock position. ♦ Replace handpiece. If symptom is corrected, return handpiece for service. ♦ Else, replace handpiece cord. If symptom is corrected, return faulty handpiece cord. ♦ Else, return controller for service.

Symptom	Possible Cause	Corrective Action
Error Messages (Continued)		
"STALL CHECK BUR LOCK"  message displays upon initial activation of the CoolFlex High Speed Drill while a bur is locked in place.	♦ The drill was not cleaned correctly and the bearings are locked due to debris build-up.	♦ Disconnect the handpiece from the controller. Rotate the bur in the handpiece with your fingers until the bur spins freely. If the message still displays when the handpiece is activated with the footswitch, return the handpiece and bur guard to ConMed Linvatec for service.
"Magnetic Field"  is displayed on the controller.	♦ The handpiece is in close proximity to a magnetic drape. ♦ Removable activation lever partially connected. ♦ Faulty handpiece.	♦ Remove the handpiece from the magnetic drape area. ♦ Completely connect the activation lever (See **"3.5.4 Leverless Handpiece Operation" on page 87**). ♦ Return handpiece to ConMed Linvatec for service.
"CONNECT HAND-PIECE" message displays when the handpiece is already plugged into the controller.	♦ Handpiece or handpiece cord not connected securely. ♦ Handpiece, handpiece cord and/or controller faulty.	♦ Securely connect handpiece or handpiece cord. ♦ Replace handpiece. If symptom is corrected, return handpiece for service. ♦ Else, replace handpiece cord. If symptom is corrected, return faulty handpiece cord. ♦ Else, return controller for service.

4.3 Calibration

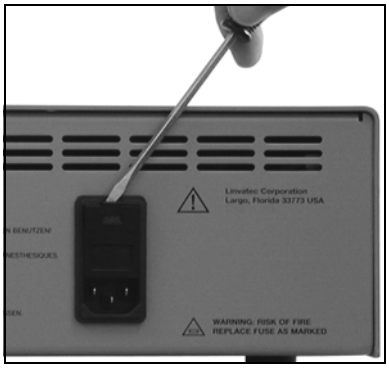
The Advantage, *PowerPro* and E9000 Systems are calibrated at the factory. No additional calibration is required unless the controller is serviced or updated. If the controller displays "**CALIBRATE?**", the calibration prompt was inadvertently activated. No further operator action is required. The system will automatically return to the operating status.

4.4 Fuse Replacement and Voltage Selection Means

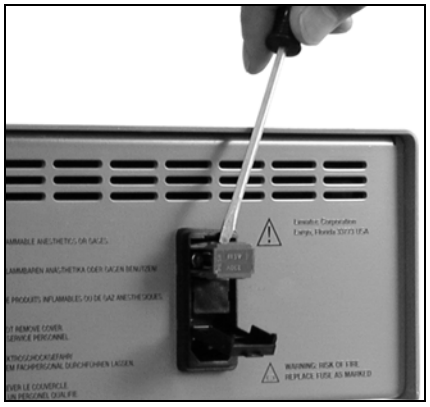
NOTE: There is no voltage selection for the D3000J or E9000J model controllers. The operating voltage is set at a fixed range of 90-110 VAC.

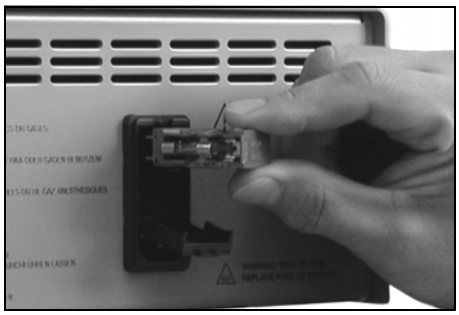
Each controller is factory pre-set for a specific voltage range. Make sure the setting for your local line (mains) supply is correct. Should there be a need for changing this requirement, the following instructions should be utilized:

1. Turn the controller power off and disconnect the mains power cord.
2. Using a flat blade tool, remove the fuse cover to access the fuse holder.



3. Remove the fuse holder and replace both fuses with the correct value, as stated on the controller or in the Technical Specifications section of this manual, that corresponds to the local voltage.





4. If the voltage in use is different from what the controller is currently set for, rotate the fuse holder and completely reinstall it so that the correct voltage is displayed through the fuse cover opening for the power source in use, either 115V or 230V.

5. Snap the fuse cover securely into place.

4.5 Bur Guard Testing Procedure

NOTE: Bur and neuro guards are to be returned to the factory or a ConMed Linvatec authorized service facility for routine maintenance every six (6) months.

1. Prior to testing, remove the guard from the handpiece.
2. Check for worn bearings:
   (a) Insert a bur into the nose of the guard.
   (b) While holding the bur, spin the guard. The guard should spin freely around the bur shaft without resistance.

   (c) Attach the guard and bur to the drill.
   (d) Operate the handpiece for at least 30 seconds. Stop the handpiece and carefully feel the end of the guard where the guard encases the shaft of the bur for overheating. If overheating is noticed**, do not use.** Return the guard for service.

4.6 Ground Continuity Test

The purpose of this test is to check the continuity of the ground bond from the power plug to the chassis whenever any maintenance has been performed.

Test Equipment Required:

Simpson Model 265 Multimeter or equivalent.

Procedure:

1. Set the multimeter to the lowest ohms range. Connect the test leads to each other and zero the instrument.

2. With the controller unplugged from the AC power source, connect one test lead to chassis ground and the other to the power cord ground pin. Measure the resistance value. The meter should measure less than 0.1 ohm.
3. If the reading obtained is greater than 0.1 ohm, the line cord or chassis wiring may be damaged. The unit should not be placed into use until the source of the problem is determined and corrected.

4.7 Leakage Test

The purpose of this test is to measure the amount of 50/60 cycle leakage from the transformer primary to the circuitry of the instrument. The AC leakage from any exposed metal part to earth ground and from all exposed metal parts having a return to chassis must not exceed 100ma.

Test Equipment Required:

ED&D Leakage Current Tester, Model LT-601 or equivalent.

Procedure:

1. Plug the power cord into the back of the controller. Plug the controller power cord into the test instrument test receptacle.
2. Turn the controller on and allow to warm up a minimum of two (2) minutes.
3. Measure the leakage current.
4. Turn the controller and test equipment off. Disconnect all test equipment from the controller.
5. If leakage exceeds limits, the unit may have a faulty line cord or power transformer and should not be placed into use until the problem has been resolved.

5.0 TECHNICAL SPECIFICATIONS

5.1 Theory of Operation

The Advantage, *PowerPro* and E9000 Control Board and Power Supply/Pump Controller provide the necessary controls for the user to operate the handpieces. The Control Board main function blocks are a housekeeping DC/DC converter, a Motorola 68HC11 micro-controller, and a Unitrode UC3625 DC three-phase brushless motor controller.

The housekeeping DC/DC converter on the Power Supply/Pump Controller provides voltages necessary to operate the Control Board and handpiece electronic components. The +50VDC motor voltage is converted to +5VDC, +6VDC and +12VDC, facilitated by a Unitrode Pulse Width Modulator, UC3843 and a Flyback conversion topology. The +50VDC motor voltage is applied to transformer primary T1, storing energy in its inductance. After a set amount of time, the voltage is removed from the primary and the stored energy is transferred to the secondary windings to provide necessary housekeeping output voltages.

The 68HC11 micro-controller gives the Control Board the decision making necessary to operate the handpieces. Speed, direction, cable mode select, DIP switch settings, identification and front panel controller display are only a few functions that interface with the 68HC11, which is an 8 bit micro-controller operating with 8 MHz clock speed. It contains multiple input and output ports that can be manipulated via a software program, which is contained in an EPROM and provides extended inputs and outputs to the 68HC11.

The DC three-phase brushless motor controller, is a mixed signal device that provides commutation and motor driver control. This device provides outstanding closed loop speed control and adds protection to the output three phase driver by limiting peak switch current. This device allows an electronic commutation scheme needed to commutate the DC three phase motor.

5.2 Controller

I.E.C. Equipment Classification: Patient Applied, continuous operation with intermittent loading as Class 1, Type B per IEC 601-1, UL 2601-1 and CSA 601-1.

The system was tested and complies with IEC 601-1-2 as follows: Operation is subject to the following two conditions: (1) The system may not cause harmful interference and (2) The system must accept any interference received, including interference that might cause undesirable operation.

The system is considered fail-safe, and can recover from error mode by power-down restart or by a method described to the user via the system display.

5.2.1 Advantage Controller

Typical Operating Requirements:	**D3000**	**D3000I**	**D3000J**
Input Voltage:	115 VAC	230 VAC	100 VAC
Frequency:	50/60 Hz	50/60 Hz	50/60 Hz
Power Consumption:	500 VA	500 VA	500 VA
Line Frequency Leakage:	Less than 100 ma		
Fuses:	Reference the specification label located on the back of the controller.		
Output:	3 phase motor drive and control circuits, 325 VA		
Port 1 Output:	180 VA		
Port 2 Output:	180 VA		
Port 3 Output:	325 VA		
Total Port Output:	325 VA max. (With 2 handpieces simultaneously connected)		
Dimensions:	17.0” (W) x 5.0” (H) x 13.75” (D) 43.2 cm (W) x 12.7 cm (H) x 35.0 cm (D)		
Weight:	19.5 lbs. (8.86 kg)		
Pump Flow Rate:	0 - 150 mL/minute		

5.2.2 E9000 Controller

Typical Operating Requirements:	E9000	E9000G	E9000J
Input Voltage:	115 VAC	230 VAC	100 VAC
Frequency:	50/60 Hz	50/60 Hz	50/60 Hz
Power Consumption:	250 VA	250 VA	250 VA
Handpiece Output:	180 VA	180 VA	180 VA
Line Frequency Leakage:	Less than 100 ma		
Fuses:	Reference the specification label located on the back of the controller.		
Output:	3 phase motor drive and control circuits		
Dimensions:	11.75” (W) x 4.63” (H) x 12.25” (D) 29.8 cm (W) x 11.8 cm (H) x 31.1 cm (D)		
Weight:	15.4 lbs. (7.0 kg)		
Pump Flow Rate:	0 - 150 mL/minute		

5.2.3 *PowerPro* Controller

Typical Operating Requirements:	PRO2000	PRO2000I
Input Voltage:	115 VAC	230 VAC
Frequency:	50/60 Hz	50/60 Hz
Power Consumption:	500 VA	500 VA
Handpiece Output:	325 VA	325 VA
Line Frequency Leakage:	Less than 100 ma	
Fuses:	T 8.0 A, 250 V	T 4.0 A, 250 V
Output:	3 phase motor drive and control circuits, 325 VA	
Dimensions:	11.75” (W) x 4.63” (H) x 12.25” (D) 29.8 cm (W) x 11.8 cm (H) x 31.1 cm (D)	
Weight:	17.3 lbs. (7.8 kg)	

The controllers are designed with “closed loop feedback” that provides immediate electronic feedback to hold handpiece speed constant, even with increasing load. Low input voltage may result in reduced speed.

NOTE: There are no toxic components used in the manufacture of the Advantage, *PowerPro* and E9000 Systems. After the useful life of the product, dispose of components and service parts properly.

5.3 Power Cord Requirements

100/120 VAC:

Use only a listed (UL, CSA) detachable power cord manufactured to the following specifications.

- Plug End
  - NEMA 5-15P hospital grade, 15 amps, 125V
- Receptacle End
  - IEC 320/CEE-22, 6 amps, 250V/15 amps, 125V
- Cord
  - UL style SJT, 18 AWG, 3 conductor

220/240 VAC

- Plug End
  - Molded straight PVC plug with double grounding system
  - DIN 49441, CEE 7/U11, 10/16A, 250V
  - CEBEC, DEMKO, KEMA, NEMKO, OVE, SEMKO, VDE, UTE, FEMKO
- Receptacle End
  - Molded straight PVC plug
  - DIN 49457, CEE 22/V, 10A, 250V
  - VDE, D, N, S, SEV, OVE, KEMA
- Cord
  - PVC, 7.2mm diameter
  - 10A, 250V
  - Conductors: 3 x 1 mm^2
  - Conductor Colors - brown, blue, green/yellow stripe

5.4 System Environmental Requirements

Operating

Ambient Operating Temperature:	+ 50°F to 104°F (+ 10°C to + 40°C)
Relative Humidity:	30% to 75%
Atmospheric Pressure:	700 hPa to 1060 hPa

Transport and Storage:

Ambient Temperature:	- 40°F to 158°F (- 40°C to + 70°C)
Relative Humidity:	10% to 100% including condensation
Atmospheric Pressure:	500 hPa to 1060 hPa

The Hall Advantage, E9000, and PowerPro Systems are intended for use in the electromagnetic environment specified below. The customer or the user of the Hall Advantage, E9000, and PowerPro Systems should assure they are used in such an environment.

Emissions Test	Compliance	Electromagnetic environment - guidance
RF Emissions CISPR 11	Group 1	The Hall Advantage, E9000, and PowerPro Systems use RF energy only for their internal functions. Therefore, RF emissions are very low and are not likely to cause any interference in nearby electronic equipment.
RF Emissions CISPR 11	Class A	The Hall Advantage, E9000, and PowerPro Systems are suitable for use in all establishments other than domestic, and may be used in domestic establishments and those directly connected to the public low-voltage power supply network that supplies buildings used for domestic purposes, provided the following warning is heeded: WARNING: This equipment/system is intended for use by healthcare professionals only. This equipment/system may cause radio interference or may disrupt the operation of nearby equipment. It may be necessary to take mitigation measures, such as re-orienting or relocating the Hall Advantage, E9000, and PowerPro Systems or shielding the location.
Harmonic Emissions IEC 61000-3-2	Class A	
Voltage fluctuations / flicker emissions IEC 61000-3-3	Complies	

The Hall Advantage, E9000, and PowerPro Systems are intended for use in the electromagnetic environment specified below. The customer or the user of these Hall Advantage, E9000, and PowerPro Systems should assure that they are used in such an environment.

Immunity Test	IEC 60601 Test Level	Compliance Level	Electromagnetic environment guidance
Electrostatic discharge (ESD) IEC 61000-4-2	± 6 kV contact ± 8 kV air	± 6 kV contact ± 8 kV air	Floors should be wood, concrete or ceramic tile. If floors are covered with synthetic material, the relative humidity should be at least 30%.
Electrical fast transients / bursts IEC 61000-4-4	± 2 kV for power supply lines ± 1 kV for input/output lines	± 2 kV for power supply lines ± 1 kV for input/output lines	Mains power quality should be that of a typical commercial or hospital environment.
Surge IEC 61000-4-5	± 1 kV line to line ± 2 kV lines to earth	± 1 kV line to line ± 2 kV lines to earth	Mains power quality should be that of a typical commercial or hospital environment.
Power frequency (50/60 Hz) magnetic field IEC 61000-4-8	3 A/m	3 A/m	Power frequency magnetic fields should be at levels characteristic of a typical location in a typical commercial or hospital environment.
Voltage dips, short interruptions and voltage variations on power supply input lines IEC 61000-4-11	<5% *Ut* (>95% dip in *Ut*) for 0.5 cycle 40% *Ut* (60% dip in *Ut*) for 5 cycles 70% *Ut* (30% dip in *Ut*) for 25 cycles <5% *Ut* (>95% dip in *Ut*) for 5 seconds	<5% *Ut* (>95% dip in *Ut*) for 0.5 cycle 40% *Ut* (60% dip in *Ut*) for 5 cycles 70% *Ut* (30% dip in *Ut*) for 25 cycles <5% *Ut* (>95% dip in *Ut*) for 5 seconds	Mains power quality should be that of a typical commercial or hospital environment. If the user of the Hall Advantage, E9000, and PowerPro Systems require continued operation during power mains interruptions, it is recommended that the Hall Advantage, E9000, and PowerPro Systems be powered from an uninterruptable power supply or battery.

Note: *Ut* is the a.c. mains voltage prior to application of the test level.

The Hall Advantage, E9000, and PowerPro Systems are intended for use in the electromagnetic environment specified below. The customer or the user of these Hall Advantage, E9000, and PowerPro Systems should assure that they are used in such an environment.			
Immunity Test	**IEC 60601 Test Level**	**Compliance Level**	**Electromagnetic environment guidance**
			Portable and mobile RF communications equipment should be no closer to any part of the Hall Advantage, E9000, and PowerPro Systems, including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter.
			Recommended Separation Distance
Conducted RF	3 Vrms	3 Vrms	$d = 1.2 \sqrt{P}$
IEC 61000-4-6	150 kHz to 80 MHz	150 kHz to 80 MHz	
Radiated RF	3 V/m	3 V/m	$d = 1.2 \sqrt{P}$ 80 MHz to 800 MHz
IEC 61000-4-3	80 MHz to 2.5 GHz		$d = 2.3 \sqrt{P}$ 800 MHz to 2.5 GHz
			where P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer and d is the recommended separation distance in meters (m). Field strengths from fixed RF transmitters, as determined by an electromagnetic site survey [a], should be less than the compliance level in each frequency range [b].

The Hall Advantage, E9000, and PowerPro Systems are intended for use in the electromagnetic environment specified below. The customer or the user of these Hall Advantage, E9000, and PowerPro Systems should assure that they are used in such an environment.

Immunity Test	IEC 60601 Test Level	Compliance Level	Electromagnetic environment guidance
			Interference may occur in the vicinity of equipment marked with the following symbol.

Note 1: At 80 MHz and 800 MHz, the higher frequency range applies.
Note 2: These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects, and/or people.

a Field strengths from fixed transmitters, such as base stations for radio (cellular / cordless) telephones and land mobile radios, amateur radio, AM and FM radio broadcast and TV broadcast cannot be predicted theoretically with accuracy. To assess the electromagnetic environment due to fixed RF transmitters, an electromagnetic site survey should be considered. If the measured field strength in the location in which the Hall Advantage, E9000, and PowerPro Systems are used exceed the applicable RF compliance level above, the Hall Advantage, E9000, and PowerPro Systems should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as re-orienting or relocating the Hall Advantage, E9000, and PowerPro Systems.

b Over the frequency range 150 kHz to 80 MHz, field strengths should be less than 3 V/m.

The Hall Advantage, E9000, and PowerPro Systems are intended for use in an electromagnetic environment in which radiated RF disturbances are controlled. The customer or the user of the Hall Advantage, E9000, and PowerPro Systems can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and the Hall Advantage, E9000, and PowerPro Systems as recommended below, according to the maximum output power of the communications equipment.

	Separation Distance According to Frequency of Transmitter		
Read Maximum Output Power of Transmitter W	m		
	150 kHz to 80 MHz	80 MHz to 800 MHz	800 MHz to 2.5 GHz
	$d = 1.2 \sqrt{P}$	$d = 1.2 \sqrt{P}$	$d = 2.3 \sqrt{P}$
0.01	0.12	0.12	0.23
0.1	0.38	0.38	0.73
1	1.2	1.2	2.3
10	3.8	3.8	7.3
100	12	12	23

For transmitters rated at a maximum output power not listed above, the recommended separation distances *d* in meters (m) can be estimated using the equation applicable to the frequency of the transmitter, where *P* is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer.

Note 1: At 80 MHz and 800 MHz, the separation distance for the higher frequency range applies.

Note 2: These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects, and people.

5.5 Footswitches (5020-053 and C9863)

Dimensions:	10.0” (W) x 1.87” (H) x 4.75” (D) 25.4 cm (W) x 4.75 cm (H) x 12.0 cm (D)
Cord Length:	Approximately 10 ft. (3 m)
Weight:	3.5 lbs. (1.58 kg)

5.6 Handpiece Cords

	MC5057	**MC5056**	**M334**
Cord Length:	Approx. 12 ft. (3.6 m)	Approx. 10 ft. (3 m)	Approx. 15 ft. (4.6 m)
Weight:	10.9 oz. (309 g)	8.5 oz. (243 g)	17.5 oz. (518 g)

5.7 Tubing Sets

Material:	PVC, ABS, Polycarbonate, Silicone, Acrylic
Overall Dimensions:	Approximately 14.0 feet (4.2 m)
Weight:	E9414 - 3.5 oz. (99 g) E9415A - 4.0 oz. (115 g) E9416/E9417 - 2.5 oz. (72 g) E9418 - 2.1 oz. (61 g)

NOTE: **These tubing sets are latex-free products.**

5.8 Handpieces

High Speed Shaver (E9005)

Operating Speeds:	
Forward and Reverse:	500 - 10,000 rpm (nominal)
Oscillate (fixed- and variable-turn):	500 - 5,000 rpm (nominal)
Default Speed (forward/reverse):	5,000 rpm (nominal)
Default Speed (oscillate):	3,000 rpm (nominal)
Torque:	9.0 in. oz.
Length:	5.75 in. (14.6 cm)
Diameter:	0.75 in. (1.9 cm)
Weight:	5.6 oz. (160 g)
Cord Length:	10 ft. (3 m)
Material:	Anodized Aluminum and Stainless Steel

CoolFlex High Speed Drill

Operating Speeds (forward/reverse)	
Default Speed (oscillate):	60,000 rpm (nominal)
Torque:	2.0 in. oz.
Length:	5.5 in. (14 cm)
Diameter:	0.75 in. (1.9 cm)
Weight:	5.3 oz. (150 g)
Cord Length:	10 ft. (3 m)
Material:	Anodized Aluminum and Stainless Steel

Cranial Perforator Drive (E9015)

Operating/Default Speed (forward only):	Variable to 750 rpm
Torque:	14 in.-lbs.
Length:	7.63 in. (19.4 cm)
Diameter:	1.25 in. (3.2 cm)
Weight:	15.7 oz. (445 g)
Cord Length:	10 ft. (3 m)
Material:	Anodized Aluminum and Stainless Steel

MicroChoice Modular Handpiece (5020-027)

Speed Settings:	10 to 100% (1,000 rpm) in 10% increments
Cannulated:	Maximum 0.125 in. (3.2 mm) diameter
Width:	4.10 in. (10.4 cm)
Height:	5.61 in. (14.2 cm)
Weight:	23 oz. (644 g)
Material:	Anodized Aluminum and Stainless Steel
Torque:	10 in. lbs.

MicroChoice Elite High Speed Drill (5020-025)

Speed Settings:	10,000 to 100,000 rpm (nominal) in 10,000 rpm increments
Default Speed:	70,000 rpm
Torque:	2 in. oz.
Bur Pull Out Force:	Exceeds 12.0 lbs. (5.4 kg)
Length:	5.85 in. (14.9 cm)
Diameter:	0.75 in. (1.9 cm)
Weight:	7 oz. (196 g)
Material:	Stainless Steel

MicroChoice Medium Speed Drill (5020-021)

Speed Settings:	1,000 to 25,000 rpm (nominal) in 2,000 rpm increments
Default Speed:	25,000 rpm
Torque:	6 in. oz
Bur Pull Out Force:	Exceeds 12.0 lbs. (5.4 kg)
Length:	4.86 in. (12.3 cm)
Diameter:	0.70 in. (1.8 cm)
Weight:	7 oz. (196 g)
Material:	Stainless Steel

MicroChoice Low Speed Drill (5020-026)

Drill Head (single color band)

Speed Settings:	250 to 2,500 rpm (nominal) in 250 rpm increments
Default Speed:	2,500 rpm (nominal)
Torque:	15 in. oz.
Length:	5.85 in. (14.9 cm)
Diameter:	0.75 in. (1.9 cm)
Weight:	4.5 oz. (126 g)
Material:	Stainless Steel

Screw/Tap Head (two color bands)

Speed Settings:	4 to 30 rpm (nominal) in 2 rpm increments
Default Speed:	30 rpm (nominal)
Torque:	25 in. oz. (screw) 55 in. oz. (tap forward) 60 in. oz. (tap reverse)

MicroChoice Sagittal Saw (5020-022)

Speed Settings:	20 - 100% (20,000 cpm) in 10% increments
Stroke:	4° arc
Length:	6.64 in. (16.9 cm)
Diameter:	1.0 in. (2.54 cm)
Weight:	6.9 oz. (195 g)
Material:	Stainless Steel

MicroChoice Reciprocating Saw (5020-023)

Speed Settings:	20 - 100% (17,000 cpm) in 10% increments
Stroke:	1/10 in. (2.54 mm)
Length:	8.17 in. (20.8 cm)
Diameter:	0.75 in. (1.9 cm)
Weight:	8 oz. (208 g)
Material:	Stainless Steel

MicroChoice Oscillating Saw (5020-024)

Speed Settings:	20 - 100% (25,000 cpm) in 10% increments
Stroke:	8° arc
Length:	7.37 in. (18.7 cm)
Diameter:	1.5 in. (3.8 cm)
Weight:	8 oz. (208 g)
Material:	Stainless Steel

MicroChoice Small Shaver Handpiece (MC9840)

Operating Speed:	300 - 5000 rpm, F/R 300 - 2,500 cpm, Single- and Multi-turn Oscillate
Torque:	19 in. oz. (nominal)
Length:	7.15 in. (18.2 cm)
Diameter:	Approx. 0.785 in. tear drop (2.0 cm)
Weight:	8.4 oz. (237 g)
Cord Length:	10 ft. (3 m) Non-detachable
Material:	Anodized Aluminum and Stainless Steel

Mini-Driver Handpiece (K500)

Operating Speed:	0 - 1250 rpm
Cannulated:	0 - 4.0 mm (0 - 0.156 in.)
Torque:	8.0 in.-lbs. (nominal)
Width:	4.375 in. (11.1 cm)
Height:	6.25 in. (15.9 cm)
Weight:	20.4 oz. (571 g)

Advantage Basic (D9820) and 2-Button (D9824) Shaver Handpieces

Operating Speed:	500 - 10,000 rpm, F/R 500 - 2,500 cpm, Single- and Multi-turn Oscillate
Torque:	22 in. oz. (nominal)
Length:	6.1 in. (15.5 cm)
Diameter:	Approx. 1.125 in. tear drop (2.9 cm)
Weight:	15.8 oz. (450 g)
Cord Length:	10 ft. (3 m) Non-detachable
Material:	Anodized Aluminum and Stainless Steel

Advantage Turbo Basic (D9920) and 2-Button (D9924) Shaver Handpieces

Operating Speed:	500 - 10,000 rpm, F/R 500 - 2,500 cpm, Single- and Multi-turn Oscillate
Torque:	35 in. oz. (nominal)
Length:	6.1 in. (15.5 cm)
Diameter:	Approx. 1.25 in. tear drop (3.2 cm)
Weight:	17.8 oz. (505 g)
Cord Length:	10 ft. (3 m) Non-detachable
Material:	Anodized Aluminum and Stainless Steel

Description	Duty Cycle at 25°C Ambient
Controller (D3000, D3000I, E9000, E9000G)	Designed to operate at its rated maximum load of 325 VA output for a time period of 2 minutes ON, 6 minutes OFF.
Controller (D3000J, E9000J)	Designed to operate at its rated maximum load of 325 VA output for a time period of 2 minutes ON, 8 minutes OFF.
High Speed Shaver Handpiece (E9005)	30 seconds ON, 5 minutes OFF.
CoolFlex High Speed Drill Handpiece (E9010)	30 seconds ON, 6 minutes OFF.
Cranial Perforator Drive (E9015)	1 minute ON, 3 minutes OFF.
MicroChoice Medium Speed Drill (5020-021)	2 minutes ON, 3 minutes OFF.
MicroChoice Sagittal Saw (5020-022)	30 seconds ON/OFF for 6 cycles, then wait 30 minutes.
MicroChoice Reciprocating Saw (5020-023)	30 seconds ON/OFF for 4 cycles, then wait 30 minutes.
MicroChoice Oscillating Saw (5020-024)	30 seconds ON/OFF for 4 cycles, then wait 30 minutes.
MicroChoice Elite High Speed Drill (5020-025)	2 minutes ON, 8 minutes OFF.
MicroChoice Low Speed Drill (5020-026) with Drill Head	1 minute ON, 3.5 minutes OFF.
MicroChoice Low Speed Drill (5020-026) with Screw/ Tap Head	100% duty cycle.
MicroChoice Modular Handpiece (5020-027)	100% duty cycle.
MicroChoice Small Shaver Handpiece (MC9840)	1 minute ON, 3 minutes OFF (no irrigation). 100% duty cycle (with irrigation).
Mini-Driver Handpiece (K500)	1 minute ON, 3 minutes OFF
Advantage Basic Shaver Handpiece (D9820)	100% duty cycle (with irrigation).
Advantage 2-Button Shaver Handpiece (D9824)	100% duty cycle (with irrigation).
Advantage Turbo Basic Shaver Handpiece (D9920)	100% duty cycle (with irrigation).
Advantage Turbo 2-Button Shaver Handpiece (D9924)	100% duty cycle (with irrigation).

6.0 ACCESSORIES

6.1 Handpieces, Attachments and Accessories

REF	Description
	Controllers
D3000	Advantage Controller (115 VAC) with AC Power Cord
D3000I	Advantage Controller (230 VAC) with AC Power Cord
D3000J	Advantage Controller (100 VAC) with AC Power Cord
E9000	E9000 Controller (115 VAC) with AC Power Cord
E9000G	E9000 Controller (230 VAC) with AC Power Cord
E9000J	E9000 Controller (100 VAC) with AC Power Cord
PRO2000	*PowerPro* Controller (115 VAC) with AC Power Cord
PRO2000I	*PowerPro* Controller (230 VAC) with AC Power Cord
	Footswitches
5020-053	*MicroChoice* Footswitch, 2 Pedal
C9863	*MicroChoice* Footswitch, 3 Pedal
	Cords and Adapters
M334	Mini-Driver to D3000 Controller Handpiece Cord
MC5056	*MicroChoice* Handpiece Cord, 10 ft. (3 m)
MC5057	Advantage Handpiece Cord, 12 ft. (3.6 m)
C7104	AC Power Cord (115 VAC)
C7105	AC Power Cord (230 VAC)
5020-055	Irrigation System Cord
E9320	APEX Adapter
K501	Mini-Adapter
	Miscellaneous Irrigation Accessories
5020-054	Controller Stand
5020-071	IV Pole Accessory
5040-180	Fluid Bag Hanger Rod

REF	Description
	Handpieces and Footswitches
E9005	High Speed Shaver Handpiece
E9010	CoolFlex High Speed Drill Handpiece
E9015	Cranial Perforator Drive Handpiece
5020-021	*MicroChoice* Medium Speed Drill
5020-022	*MicroChoice* Sagittal Saw
5020-023	*MicroChoice* Reciprocating Saw
5020-024	*MicroChoice* Oscillating Saw
5020-025	*MicroChoice* Elite High Speed Drill
5020-026	*MicroChoice* Low Speed Drill
5020-027	*MicroChoice* Modular Handpiece
MC9820	*MicroChoice* Basic Large Shaver Handpiece
MC9828	*MicroChoice* Full-Function Large Shaver Handpiece
MC9840	*MicroChoice* Small Shaver Handpiece
C9820	APEX Basic Large Shaver Handpiece
C9824	APEX Two-Button Large Shaver Handpiece
C9828	APEX Full-Function Large Shaver Handpiece
C9840	APEX Small Shaver Handpiece
D9820	Advantage Basic Shaver Handpiece
D9824	Advantage 2-Button Shaver Handpiece
D9920	Advantage Turbo Basic Shaver Handpiece
D9924	Advantage Turbo 2-Button Shaver Handpiece
K500	Mini-Driver Electric Handpiece
PRO2100E	*PowerPro* Electric Modular Handpiece
PRO2200E	*PowerPro* Electric Two-Trigger Handpiece
PRO2300E	*PowerPro* Electric Oscillator Handpiece
PRO6100	*PowerPro* Electric II Modular Handpiece
PRO6125	*PowerPro* Electric II Oscillator Handpiece
PRO6135	*PowerPro* Electric II Reciprocator Handpiece

REF	Description
	CoolFlex Handpiece Guards
E9011-1	Medium Bur Guard - Limited Reuse
E9011-2	Long Bur Guard - Limited Reuse
E9011-3	Extra Long Bur Guard - Limited Reuse
E9011-7	Short Neuro Guard - with E9012 Locking Collar
E9011-8	Medium Neuro Guard - with E9012 Locking Collar
E9011-9	Long Neuro Guard - with E9012 Locking Collar
	E9000 Irrigation Tubing and Accessories
E9414	Tubing Set for CoolFlex High Speed Drill without Irrigation - Disposable
E9415A	Tubing Set for CoolFlex High Speed Drill with Irrigation and an affixed irrigation tip - Disposable
E9416	Tubing Set for use with 4.2 mm Shaver Blades - Disposable
E9417	Tubing Set for use with 3.7 mm Shaver Blades - Disposable
E9418	Tubing Set for use with Group 3 Handpieces (5020-021, 5020-022,5020-023, 5020-024, 5020-025, 5020-026) - Disposable
	***MicroChoice* Guards & Attachments**
5020-034	Dental Implant Drill Head
5020-035	Dental Implant Screw/Tap Head
5020-060	Medium Bur Guard
5020-061	Long Bur Guard
5020-062	Extra Long Bur Guard
5020-063	20° Angle Attachment
5020-064	XL 20° Angle Attachment
5020-065	70° Contra Angle Attachment w/Surgical Head
5020-066	90° Angle Attachment
5020-067	Laminectomy Guard
5020-068	Tissue Retractor Guard
5020-069	70° Contra Angle Attachment w/Dental Head
5020-074	Dental Attachment Cleaning Ring
5020-075	Low Speed Attachment Wrench

REF	Description
	MicroChoice **Modular Handpiece Attachments and Accessories**
5020-028	Wiredriver Attachment
5020-029	Universal Drill Attachment
5020-030	5/32” Jacobs Chuck Attachment w/key
5020-031	High Torque Jacobs Chuck Attachment w/key
5020-032	Pin Driver Attachment
5020-041	1/4” Jacobs Chuck
5020-042	1/4” High Torque Jacobs Chuck
	MicroChoice **Miscellaneous**
0999-052	1/4” Replacement Chuck Key
0999-053	5/32” Replacement Chuck Key
1375-003	Bur Changer
1375-015	Bur Cleaning Brush
1375-037	Pana Spray
5020-057	Replacement Safe Slide
5020-058	Handpiece Replacement Lever
5020-059	XL Handpiece Lever
5053-008	Bur Rack
5053-123	Wire Guard
5053-124	Cleaning Brush
	MicroChoice **Irrigation Accessories**
5040-130	Reusable Irrigation Handpiece Clip
5040-200	Reusable Medium Bur Tip
5040-201	Reusable External 70° & 90° Angle Tip
5040-202	Reusable Long Bur Tip
5040-203	Reusable Internal 70° & 90° Angle Tip
5040-205	Reusable Sagittal Saw Tip
5040-206	Reusable Oscillating Saw Tip
5040-207	Reusable Reciprocating Saw Tip
5040-208	Reusable XL Bur Tip

REF	Description
	MicroChoice **Irrigation Accessories**
5040-219	Disposable Universal Irrigation Tip
5040-220	Disposable Medium Bur Tip
5040-222	Disposable Long Bur Tip
5040-228	Disposable XL Bur Tip
	Irrigation Tubing
5040-120	Disposable Tubing Set
5040-128	Reusable Y Tubing Set
5040-129	Reusable Tubing Set
	PowerPro **Handpiece Attachments and Accessories**
PRO2029	Trinkle/AO Attachment
PRO2030	5/32" (4.0 mm) Jacobs Chuck Attachment w/key
PRO2038	AO Small Attachment
PRO2040	A.O Reamer Attachment
PRO6040	AO/ASIF Reamer Attachment, 5:1 Gear Ratio (Intended for use with the PRO6100 *PowerPro* Electric II Modular Handpiece
PRO2041	1/4" (6.5 mm) Jacobs Chuck Attachment
PRO2042	1/4" (6.5 mm) High Torque Jacobs Chuck Attachment
PRO6042	1/4" (6.5 mm) High Torque Jacobs Chuck Attachment, 5:1 Gear Ratio (Intended for use with the PRO6100 *PowerPro* Electric II Modular Handpiece
PRO2043	Sagittal Saw Attachment
PRO2045	Reciprocating Saw Attachment
PRO2046	Zimmer/Hudson Drill Attachment
PRO2047	Zimmer/Hudson Reamer Attachment
PRO6047	Zimmer/Hudson Reamer Attachment, 5:1 Gear Ratio (Intended for use with the PRO6100 *PowerPro* Electric II Modular Handpiece
PRO6050	1/8" (3.175 mm) Keyless Chuck Attachment
PRO2250	1/4" (6.5 mm) Keyless Chuck Attachment
PRO2060	Aesculap Reamer Attachment
PRO6060	Aesculap Reamer Attachment, 5:1 Gear Ratio (Intended for use with the PRO6100 *PowerPro* Electric II Modular Handpiece
PRO2075	Hudson Drill Attachment

REF	Description
	PowerPro **Handpiece Attachments and Accessories**
PRO2065	Hudson Reamer Attachment
PRO6048	Hudson Reamer Attachment, 5:1 Gear Ratio (Intended for use with the PRO6100 *PowerPro* Electric II Modular Handpiece
PRO2070	AO Drill Attachment
PRO2028	Wiredriver Attachment for use with the PRO2200E *PowerPro* Electric Two-trigger Handpiece
PRO6028	Wire Driver Attachment for use with the PRO6100 *PowerPro* Electric II Modular Handpiece
PRO2032	Pin Driver Attachment for use with the PRO2200E *PowerPro* Electric Two-trigger Handpiece
PRO6032	Pin Driver Attachment for use with the PRO6100 *PowerPro* Electric II Modular Handpiece
PRO2514	Radiolucent Drive Adapter Attachment

REF	Description
	Mini-Driver Handpiece Attachments and Accessories
K501	Mini-Adapter
K109	1/4” Jacobs Chuck Attachment
D298L	Key for 1/4” Jacobs Chuck Attachment
K110	5/32” Jacobs Chuck Attachment
D298K	Key for 5/32” Jacobs Chuck Attachment
K111A	Automatic Wire Driver Attachment
K112	Trinkle Chuck Attachment
K113	Hudson Chuck Attachment
K114A	ASIF/AO Twist Drill Chuck Attachment
K210	High Torque Jacobs Chuck Attachment
K211	Automatic Pin Driver Attachment
K220	Sagittal Saw Attachment
K201	Wrench for K220 Sagittal Saw Attachment
D520	Screwdriver Attachment
D521	Slotted Bit
D522	Cruciate Bit
D523	Phillips Bit
D524	Screwdriver Attachment
D525	Hex Bit for AO type screws
M105A	Blitz II Surgical Instrument Cleaner and Lubricant
M317	Lubricant

7.0 CUSTOMER SERVICE

7.1 Assistance and Repair

If you need technical assistance regarding the use or application of this product, or you encounter a problem that requires servicing or repair, contact ConMed Linvatec Customer Service at 800-925-4255 or your ConMed Linvatec Sales Representative. Outside the U.S. contact your local ConMed Linvatec Representative.

Report any events involving injuries or malfunctions to the ConMed Linvatec Regulatory Product Support.

Products returned for repair must have an authorized Service Request (SR) number prominently displayed on the box and included on all paperwork. Refer to this number if making inquiries about the repair status. Please call ConMed Linvatec Customer Service and provide the following information to obtain an S.R. number prior to returning any product for repair:

- Product Number
- Serial/Lot Number - if applicable Number
- Reason for Return
- Original Invoice Number
- Date of Purchase
- Detailed description of the problem

ConMed Linvatec
Attn.: Customer Service Dept.
11311 Concept Boulevard
Largo, Florida 33773-4908 USA

Customer Service		
(within U.S.)	**Phone:**	**800-925-4255**
	FAX:	**727-399-5256**
(outside U.S.)	**Phone:**	**727-392-6464**
	FAX:	**727-397-4540**
ConMed Linvatec Regulatory Product Support		
(within U.S.)	**Phone:**	**800-237-0169**
(outside U.S.)	**Phone:**	**727-392-6464**

Rx ONLY

EC REP
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